

A M A T E U R R A D I O

DECEMBER 1962



2/-

TRANSISTOR POWER SUPPLY

A. & R. Type PS25, 45 watts output,
To Clear £17/10/0 incl. tax
A. & R. Type PS21, 60 watts output,
To Clear £22/10/0 incl. tax

LSG11 SIGNAL GENERATOR

120 Kc.-390 Mc.

Freq. range 150 Kc. to 390 Mc. on fundamental; 120 to 240 Mc. on harmonics. Mod. freq. 400 and 1,000 c.p.s. Tubes: 12BH7, 6AR5. Rectifier: half wave selenium. Provision for crystal oscillator (not supplied), 1 to 15 Mc. 100, 117 or 330v. a.c. input. 50/100 c.p.s. Size: 7 1/2 x 10 1/2 x 4 1/2 in. Weight 6 lb.

Price: LSG11—£16/17/6 inc. tax

PLUGS AND SOCKETS

Jones' small 6-pin Plug and Socket 7/6 pair
2-pin Mike Plugs and Sockets, 4/6 pair
Phone Plug (with 2 ft. Cord) and Jack,
Brand new 2/6 set

CO-AXIAL CABLE

50 ohm, UR67, 3/8" diam., in 25 yd.
Rolls 45/-; or 2 1/2 yd.
52 ohm UR43, 3/16" diam., in 12 yd.
Rolls £1; or 2 1/2 yd.
72 ohm UR70, 3/16" diam., in 27 yd.
Rolls 39/6; or 1 1/2 yd.

JAPANESE METERS

0-500 μ A., 1 1/2" square, MR2P 37/6
0-1 mA., 2 1/2" square, MR52 £2
0-1 mA., 3" square, MR65 £2/7/6

POWER TRANSFORMERS

150-0-150v., 30 mA., c.t. 6.3v., 1.7a. 32/6
225v.-0-225v., 50 mA., 6.3v., 2a. £3
250v.-0-250v., 80 mA., 6.3v., 1a., 6.3v.
c.t. 2a. £2/10/0

SPECIALS

200H Multimeter £5/12/6
VCR97 type C.R.T. Sockets, bakelite,
New 10/- each
EF50 Valve and Ceramic Socket 6/6
EA50 Valve Sockets 1/6
Left/Right indicators, Type 1, with
shunt 200 μ A., less shunt 100 μ A., 25/-
Type "S" Time Delay Relay, 10-second,
2R7540, 30-volt 39/-
Ceramic Shaft Couplings 3/6
Pointer Knobs, small (black or wh.) 1/6
Belling Lee Coaxial Plugs and Sockets,
suit 1" coax, 3/6 socket, 4/- plug
Crystal Earphone (suit Transistor
Radio) 5/6

Call Books 6/-, Log Books 5/6, post ext.

NEW VALVES

1A3	2/6	10A	£1
1A5	5/-	5A	£1
1C7	3/-	7A	£1
1D5GT	5/-	5A	£1
1D8	7/6	3A	£1
1H4	5/-	5A	£1
1H6	5/-	5A	£1
1H6	5/-	5A	£1
1K4	5/-	5A	£1
1K5	5/-	5A	£1
1K7	5/-	5A	£1
1L4	5/-	5A	£1
1M5G	5/-	5A	£1
1N5	5/-	5A	£1
1P5	2/-	10A	£1
1Q5	5/-	5A	£1
1S4	7/6	3A	£1
185	10/-		
1T4	5/-		
2A5	7/6		
2A6	7/6		
2D21	15/-		
2X2	5/-	5A	£1
3A4	10/-		
3A5	10/-		
3AP1	25/-		
3BP1	35/-		
3Q5	5/-	5A	£1
5U4GB	14/6		
5V4G	15/-		
5Y3GT	15/9		
5Z3	17/6		
6A3	7/6	3A	£1
6A6	7/6		
6AG7	12/6		
6AJ5	7/6	3A	£1
6AM5 (EL91)	10/-		
6AM6 (EP91)	10/-		
6B7	10/-		
6BE6	15/-		
6C4	5/-	5A	£1
6C5	5/-	5A	£1
6C6	5/-	5A	£1
6C8	10/-		
6CH6	2/-		
6D6	5/-	5A	£1
6F5	7/6		
6F6	12/6		
6F7	10/-		
6F8	5/-		
6H6	Glass 2/6		
6J6	10/-		
6K7	5/-	5A	£1
6K8G	20/-		
6K8GT	12/6		
6L7	5/-	5A	£1
6SA7	7/6		
6SC7	7/6		
6SF5	7/6	3A	£1
6SH7	4/-	5A	£1
6SJ7	12/6		
6SL7GT	12/6		
6SN7	12/6		
6SS7	7/6	3A	£1
6T7	7/6	3A	£1
6V4	11/4		
6V6GT	16/-		
6X5	15/-		
6Y6	5/-	5A	£1
7A8	2/-	11A	£1
7C5	5/-	5A	£1
7C7	2/-	12A	£1
7E6	3/6	7A	£1
7W7	2/6	10A	£1
12A6	4/-	6A	£1
12A7	5/-	5A	£1
12A7T	15/-		
12C5	5/-		
12H6	3/6		
12J5	5/-	5A	£1
12K8	5/-	5A	£1
12SA7GT	10/-		
12SK7	5/-	5A	£1
12SQ7	5/-		
12SR7	5/-	5A	£1
14A7	3/6	7A	£1
16Z5	5/-	5A	£1
16Z6	5/-	5A	£1
16Z9	5/-	5A	£1
30	1/3		
35T	30/-		
717A	7/6	3A	£1
726A	10/-		
86	13/-		
867	7/6	3A	£1
868	10/-		
869	20/-		
815	15/-		
830B	15/-		
832A	19/6		
866	20/-		
954	5/-	5A	£1
955	5/-	5A	£1
956	5/-	5A	£1
958A	2/6	10A	£1
2051	5/-		
5763	22/-		
AV11	2/11		
DL75	2/6	10A	£1
EA50	2/-	10A	£1
EC91/EA94	10/-		
EC35	20/-		
ECH33	20/-		
EF38	5/-	5A	£1
FF39	5/-	5A	£1
EF50	3/6		
EF70	5/-	5A	£1
EF72	5/-	5A	£1
EF73	5/-	5A	£1
FL41	10/-		
EY91	5/-		
KT61 (6V6)	15/-		
QOE93/12	47/6		
QOV96/40	97/6		
RL16	7/6	3A	£1
UL41	7/6	3A	£1
VR53	5/-	5A	£1
VR101	5/-	5A	£1
VR102	5/-	5A	£1
VR103	5/-	5A	£1
VR105	10/-		
VR136	2/-	12A	£1
VR137	2/6		
VT25	5/-		
VT127	4/11	5A	£1
VT501	7/6	3A	£1



Compliments of Season

We extend to our many Customers a
Merry Christmas and Happy New Year



RECORDING TAPE

53" REELS, Well Known Make
BRAND NEW IN CARTON
No. 111A-8 Plastic backing, 1/4" x
850 ft. £1 reel.

No. 150-12 Polyester backing, extra
play, 1/4" x 1275 ft., 30/- reel.
Empty Tape Reels — 5" 6/6, 3" 5/-.

AMERICAN POTENTIOMETERS

American Bradley, 2" long, 1/4" shaft,
1" diam. Available in following sizes:
20,000, 25,000, 30,000, 50,000, 100,000,
250,000 ohms, 1/4, 1 and 2 megohms.

Price 2/6 each
50 ohm 25w. wire wound (D129) 5/-

OA79 and OA81 DIODES

Well known make. Brand New.
To Clear—2/6 each

CRYSTAL MICROPHONES

Piezo LM3, lapel type 25/-
Piezo HM7, hand type w/plug, 35/-
Piezo SM1, hand type w/plug, 27/6
Piezo DX29, Dynamic Mike, pencil type
with stand £4/2/6

5.5 Mc. VIDEO COILS

Contains slug-tuned coil former,
6d. each

No. 122 COMPONENTS

Headphone and Microphone Sets. Good
condition 25/- set

IN21 SILICON DIODES

U.h.f. mixer, design freq. 3,000 Mc.
7/6 each, or 3 for £1.

HAM RADIO SUPPLIERS

5A MELVILLE STREET, HAWTHORN, VICTORIA Phone 86-6465

North Balwyn tram passes corner. Money Orders and Postal Notes payable North Hawthorn P.O. 5/- Packing Charge.

"AMATEUR RADIO"

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA. FOUNDED 1910.

DECEMBER 1962

Vol. 30, No. 12

Editor:

K. M. COCKING VK2ZPQ

Publications Committee:

G. W. Baty (Secretary) VK1AOM
S. T. Clark VK3ASC
R. S. Fisher VK1OM
R. W. Higginbotham VK1JN
E. C. Manifold VK1EM

Advertising Enquiries:

C/o P.O. Box 36, East Melbourne, C.S. Vic.
OR
Mrs. BELLAIRS, Phone 41-3535. 478 Victoria
Parade, East Melbourne, C.S. Victoria. Hours
10 a.m. to 3 p.m. only.

Publishers:

VICTORIAN DIVISION W.I.A.,
Reg. Office: 52a Franklin St., Melbourne, Vic.

Printers:

"RICHMOND CHRONICLE." Phone 42-5418.
Shakespeare Street, Richmond, E.S. Vic.

*
All Correspondence should be forwarded to:—

THE EDITOR,
"AMATEUR RADIO,"
P.O. BOX 36,
EAST MELBOURNE, C.S. VIC.

before the 8th of the month preceding publication. Technical articles should preferably be typed, double spaced, on one side of the paper, signed and numbered. All drawings should be large and done in Indian ink.

*
Issued monthly on 8th of month. Subscription rate in Australia and Overseas is \$4/- a year, in advance (post paid).
Back copies may be available; enquiries to P.O. Box 36, East Melbourne, C.S. Vic.
Any complaint regarding non delivery of "A.R." and change of address should be made to the Secretary of the member's Division and not to "A.R." direct.

*
WI Broadcasts:
VK2SWI: Sundays, 1100 hours EST, simultaneously on 3073 Kc., 7146 Kc., 50.16 Mc. and 145.13 Mc.; intrastate call-backs taken on 7050 Kc. VHF 1930 hours EST on 50.16 Mc. and 145.13 Mc.; call-backs taken on 3 metres.

VK2SWI: Sundays, 1230 hours EST, simultaneously on 3073 and 7146 Kc., 51.016 and 145.55 Mc. Intrastate hook-ups taken on 7135 Kc.

VK4WV: Sundays, 0900 hours EST, simultaneously on 7146 Kc. and 14.342 Mc. Intrastate hook-ups taken on 7135 Kc.

VK2SWI: Sundays, 0900 SAT. on 7146 Kc. Relays on 3.7, 14.3, 56.52, 144 and 285 Mc. Intrastate hook-ups taken on 7135 Kc.

VK5WV: Sundays at 0830 hours WAST, on 7146 Kc. Intrastate hook-ups taken on 7135 Kc.

VK7WV: Sundays at 1000 hours EST, on 7146 Kc. and 3073 Kc. Intrastate hook-ups taken on 7115 Kc.

OUR COVER

Senior Scouts, Dennis Price, of 8th Footscray, and Terry McGuire, of 2nd Altona, participate in the Jamboree on-the-Air from VK3AHT's shack at Yarraville, Vic. See page 13 of this issue.

FEDERAL COMMENT

★

SEASONAL GREETINGS

Year after year at this time it is the privilege of the members of the Federal Executive, on behalf of the Federal Council of the Wireless Institute of Australia, to extend to Amateurs everywhere hearty seasonal greetings.

Apart from the fact that December every year ushers in the festive season, it also is the conclusion of a year's work for all of us concerned with looking after the administrative affairs of our Institute. Scattered all over the Commonwealth are a goodly number of Amateurs who not only carry on the work associated with their livelihood, but also find time to conduct their hobby of Amateur Radio, play sport, belong to other organisations and take a part in the administration of the W.I.A. To these people we extend our personal thanks for the work they have done in keeping alive our great hobby.

Christmas also brings holidays to many of us and time is generally found to clean up a lot of those unfinished projects. Warmer weather, longer days and a general feeling of goodwill to all enhances the Amateur spirit of friendliness the world over. And so we wish all Amateurs, wherever they may be at this time, a Very Happy Christmas.

ROSS HULL MEMORIAL V.H.F. CONTEST, 1962-63

This is the 13th year of the Ross Hull Memorial V.h.f. Contest which, each year, is held over a period of approximately one month commencing in mid-December and concluding in mid-January. It perpetuates the memory of an Australian Amateur whose brilliant career was abruptly terminated in 1938 when he accidentally came in contact with high voltage associated with an experimental television power supply.

At the time of his untimely passing, Ross Hull was the editor of the American "QST" magazine known to Amateurs throughout the world. His contributions to the v.h.f. field of radio transmission and reception were years ahead of his time and formed the basis for the advancement of the art still further after his passing.

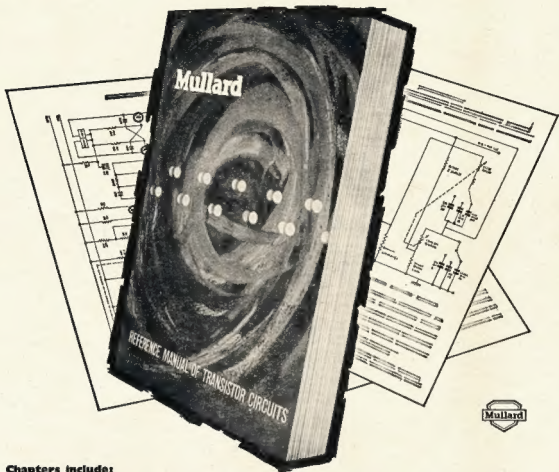
Today we remember him as we devote a month of our spare time to making contacts on the v.h.f. bands, which he envisaged and knew could be done, over distances not possible at that time. Like many Amateurs with ability and tremendous zeal to explore, Ross Hull pioneered the v.h.f. bands when it was considered they would be worthless for other than line-of-sight communication. Today we are reaping the benefits of his early efforts in a field which literally yet is unexplored. It is the Amateurs of today who, by their interest in these frequencies, are finding out more and more of what happens to signals under various temperature and climatic conditions. The Ross Hull Memorial V.h.f. Contest encourages these people to be on the air together at a time of the year most favourable to v.h.f. propagation.

FEDERAL EXECUTIVE, W.I.A.

CONTENTS

The VK7 W.I.A. V.H.F. Group	3	W.I.C.E.N. Exercise by S.A. Division	20
144 Mc. Communicator	3	Federal and Divisional Monthly News Reports	21
Notes on the BC221	5	DX	16
Technical Topics	9	Sidband	18
Results of 1962 R.D. Contest	14	SWL	17
"Success of Jamboree-on-the-Air due to Ham"	13	Index to Volume 30—1962	28
Youth Radio Clubs	17		

LATEST REFERENCE MANUAL OF TRANSISTOR CIRCUITS



Chapters include:

- The Junction Transistor
- New Techniques
- Characteristics
- Basic Circuits
- Semiconductor Diodes
- Practical Circuit Designs

This new manual of transistor circuits has been prepared by Mullard engineers as an up to date and readable volume which will be of use and interest to technicians, service engineers, junior designers and students of electronics.

It has a page size of $8\frac{1}{2}'' \times 5\frac{1}{2}''$ and describes more than 60 circuits — over 30 of which are being made available for the first time — including both domestic and industrial applications.

Mullard-Australia Pty. Ltd., Box 2118, G.P.O., Sydney

Please send me.....copies of "Reference Manual of Transistor Circuits" for which I enclose.....remittance, being 15/- per copy plus 1/5 postage.

Name.....

Address.....

State.....

MULLARD-AUSTRALIA PTY. LTD., 35-43 CLARENCE ST., SYDNEY, N.S.W. 2006 AND 123-129 VICTORIA PARADE, COLLINGWOOD, N.S. VIC. 41 6644

Associated with MULLARD LIMITED, LONDON

MT110

THE VK7 W.I.A. V.H.F. GROUP 144 Mc. COMMUNICATOR

D. A. THORNE,* VK7ZAI

THE V.h.f. "Communicator" was designed, as a group project, to provide reliable two-way communications on the 144 Mc. band, over short to medium haul paths.

This unit was originally designed for emergency purposes, although they have been put to many uses for which they were not intended, and given reliable results. The original design was described in a "CQ" for October 1957, but after careful scrutiny, the "experts" modified considerably this design to produce a more "Australianised" model.



A design emerged after much head scratching, which has for the last nine months been undergoing the most rigid field tests. To date the best results so far have been a 208-mile contact (R5/S6) from Flinders Island (VK-7ZBE/P) to Mt. Wellington, Southern Tasmania (VK7ZAI/P-VK7ZAL/P), which appeared to be "extended ground wave".

In the field of short-haul working, three units were used by W.I.A. members to provide "ship to shore" communications for the 1961 Royal Hobart Regatta. All units built have been equipped for transmission on 145.0 megacycles, this frequency being selected as the V.h.f. Group emergency and inter-communication channel.

All components, including the cabinet are standard stock items, obtainable in Hobart with difficulty, and elsewhere in Australia with ease.

CIRCUIT DESCRIPTION

The r.f. input to the receiver is capacity coupled to the grounded grid r.f. stage (half 12AT7). This stage is broadly tuned by the LC in the cathode. A small gain is provided by this stage, but the main purpose is of isolation of the detector stage from the aerial, to prevent unwanted radiation and pulling effects caused by aerial changes.

The output of the r.f. stage is capacitively coupled to the detector stage. The super regen. detector (half 12AT7) is of novel design, having high sensitivity, relatively good noise figure, and a smoothly operating quench control which is important in obtaining high sensitivity.

The output of the detector is capacitively coupled to the audio stages (half 6CQ8-6AQ5) which is also used as the modulator on transmit. The switching arrangement is done by a single rotary switch, which is designated on the front panel as the Transmit-Receive switch.

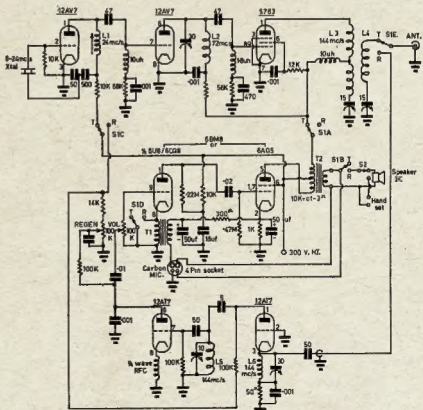
The transmitter consists of either a 8 or 24 Mc. crystal, being excited in a "Robert Dollar" overtone c.c.t. (half 12AV7). The output of the oscillator (24 Mc.) is capacity coupled to the second half of the 12AV7, the anode c.c.t. of which is resonated at 72 Mc.

The 72 Mc. output is capacitively coupled to the 5763 doubler (approx. 1½ mA. drive with a 300 volt supply). The anode c.c.t. of the 5763 is series tuned to 144 Mc., as is the output link, so that various types of aerial can be used with a minimum of trouble with re-tuning problems.

R.f. outputs of from 2.5 to 3 watts have been obtained with the four units built, this power approx. correct for 100% modulation, a more important factor than trying to increase the r.f. power, with a subsequent deterioration of modulation percentage.

The 12AV7 double triode is used in preference to the 12AT7 because in actual tests the drive available to the 5763 was from $\frac{1}{2}$ to 1 mA. more.

The modulator consists of a carbon mike, feeding into the receiver audio section, by suitable switching arrangement. The modulator is choke coupled



- L1-12 turns, $\frac{1}{8}$ " diam., slug tuned, No. 22.
 L2-4 turns, $\frac{1}{8}$ " diam., $\frac{1}{8}$ " long, No. 16.
 L3-4 turns, $\frac{1}{8}$ " diam., $\frac{1}{8}$ " long, tap 3 turns
 up, No. 16.
 L4-1 turn, $\frac{1}{8}$ " diam., $\frac{1}{8}$ " long, No. 16.
 L5-3 turns, $\frac{1}{8}$ " diam., $\frac{1}{8}$ " long, No. 16.
 L6-3 turns, $\frac{1}{8}$ " diam., $\frac{1}{8}$ " long, No. 16.
 T1-Carbon mike transformer.
 T2-Rola C7, 10K ohms c.t.
 Filaments are wired to suit either 5 or 12 volts.

* 308 Park St., Newtown, Tas.

The Communicator was loaned by B. Eyre, VK7ZBF, and Photographs taken by L. Jensen, VK3LJ.

to the 5763 by means of a centre tapped type C speaker transformer. The impedance match offered by this arrangement is very close to calculated impedance. Modulation is in the order of 100%, actual level being adjusted by varying the distance between the lips and microphone, eliminating the need for a separate modulation control.

The bandwidth of the modulator is approx. 3 kc. (200 c.p.s. to 3 kc.) when a carbon mike is used. Modulation is applied to the plate and screen of the 5763 and to the plate of the 12AV7 tripler stage (72 Mc.). The carbon mike obtains its exciting voltage from a voltage divider network in the cathode of the 6AQ5, so making this unit suitable for operation on either a d.c. or a.c. power supply.

although both a long wire and a wire bed mattress have been used with usable results, which may be necessary in some emergency.

CONSTRUCTION

The Communicator is built to fit a standard instrument case measuring 9" long, 6½" high and 5½" deep. The steel front panel supplied with the case was not used, but a aluminium panel substituted, being easier to work. The new panel measures 9" x 6½".

Consult the photograph of the front panel to work out the approx. layout. The dial used is a Jabel No. 2, with dial scale assembly drive, cursor, knob and panel, 180°.

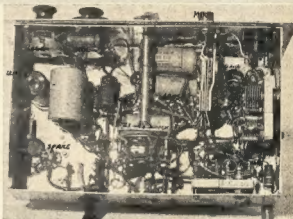
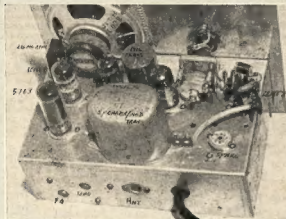
The speaker is a Rola type 3C. The chassis is a stock 8" x 5" x 2½".

sible to use components which may be on hand.

The microphone/handset connections are brought into the unit through a 4-pin miniature plug and socket on the right hand end of the front panel. The power connection to the unit is via an 8-pin plug, which is mounted on the back of the chassis, the right hand end viewed from the rear. This plug protrudes from the rear of the case.

The aerial connector is on the rear of the chassis, located in the middle. It is a Belling Lee socket type L734/J/AL.

The photos accompanying this article are those of the Mk. 2 model, the differences being a diode tune-up device being included. The meter for this has



A carbon hand mike is normally used, but in cases where privacy is required, a combination hand-set is plugged in and the speaker on-off switch can be put in the desired position.

300 volts at 100 mA. is required for full 3 watts output. Various types of supplies have been used, including vibrator, vibrator and mains operated, with no obvious troubles (hash, etc.). The approx. drain of the unit is 3 amps. on 12 volts, and 8 amps. on 6 volts.

The main aerial used with this set is the quarter wave whip, with communications being maintained up to 12 miles over reasonably smooth ground. An eight element yagi was used to make the 208-mile contact mentioned before,

Consult the photograph of the top chassis layout for approx. layout of valve and components. The speaker/modulation transformer used is a Rola C7 10,000 ohm centre tapped. The microphone transformer is a standard carbon mike transformer, the smaller the physical size the better.

The tuning gang is, if possible, ceramic insulated, having two fixed plates and one moving plate. The crystal is an FT243 type, this type being common among Hams, and being the most convenient size to fit in the space available.

To determine the under-chassis layout, consult the photograph, the layout being fairly flexible, so making it pos-

been placed in the position taken up formally by the 4-pin mike/handset socket, connection being made with the double jacks on the Mk. 2 model, in the position formally used for the speaker on/off switch, this facility not included on this model.

The photographed model has yet to have the 8-pin plug for power connection fitted.

The VK7 W.L.A. V.h.f. Group is willing to answer any requests for further information on this unit.



TWO-METRE DX

ZL2HP and some of the other 2 mx operators in Palmerston North will be beaming across the "pond" very frequently again this coming DX season. No doubt stations in other ZL districts will be doing the same. ZL2HP and the gang will also be monitoring six metres for crossband contacts, so it would be appreciated if any of the VK six metre boys (who also have 2 mx gear) could announce occasionally during good openings that they will tune the 144 Mc. band.

Further details may be obtained from Trev. J. Kendrick, ZL2HP, 3 Ascot St., Palmerston North, New Zealand.

CHOOSE THE BEST—IT COSTS NO MORE



G. T. LEMPIERRE & CO. LIMITED. Head Office: 27-41 Bowden Street, Alexandria, N.S.W., and at Melbourne • Brisbane • Adelaide • Perth

NOTES ON THE BC221*

HERBERT W. GORDON, W1KWB/W1IBY

IN the practical sense, it isn't my wish to explain the operation of the BC221 or LM Frequency Meter since this subject is covered adequately in the calibration book accompanying each instrument and is fully covered in the technical manual TM11-300 issued by the government printing office in U.S.A. Rather, it is my wish to convey information not ordinarily found or otherwise available which will help the user obtain the maximum benefit from the LM series or BC221 type of instrument.

Before detailing what these specifics are, I would like to stress the need for thorough and complete understanding of the basic operating functions of the instrument. As a matter of fact, the operator should be so conversant and so familiar with these functions that he should be able, almost subconsciously, to understand the limitations and order of processes required in using the instrument.

Assuming such a degree of experience and utilizing the best possible techniques, it is possible to achieve an order of accuracy with the BC221 amounting to 0.002% or even better. In contrast, the inexperienced, taking a BC221 as he gets it and merely getting it to function, will probably realise errors as great as 0.015%.

DETERMINING INSTRUMENT CONDITION

Before going any deeper into the subject, it is recommended that each BC221 be examined or conditioned, to determine its degree of condition, and I don't mean mechanical condition as much as I do electro-mechanical condition. Actually this is one instrument where every screw and bolt has to be tight, where every soldered wire has to be right, and where any significant changes in some portions of the circuit simply may be tolerated.

To determine whether your BC221 is in good condition, two simple tests are available. However, the first thing to do in checking your BC221 is to remove the nameplate, carefully putting aside the screws and lock washers. Behind the nameplate there should be chalked or crayoned a number. This was put on by the original manufacturer and this number subsequently became the serial number on the nameplate and on the frontpiece of the calibration book.

If your BC221 calibration book number does not match the plate or the number behind the plate, you are in serious difficulty. Many plate changes were employed by disreputable dealers in an effort to sell BC221s. I have noted in examining some thousands of instruments that, at various times, the manufacturer omitted marking his serial number behind the nameplate, so this omission by itself shouldn't be considered too serious.

★ The BC221 (or LM version), a desirable instrument in the shack, can be made more versatile and dependable with the suggested techniques and modifications. A comprehensive summary of all past articles covering this Frequency Meter is also given.

If the book does not match your instrument it is still possible to use the frequency meter and calibrate it with its own harmonic markers and sub-harmonic markers and with the aid of a slide rule, provided that the instrument is otherwise in excellent condition and complete. Such a process of calibration involves a great deal of work and careful concentration to avoid errors and was thoroughly covered in a previous magazine article.¹

CHECKING FOR ACCURACY

To check the frequency meter for accuracy the following procedure may be used. Set the function switch to the "heterodyne oscillator" or "operate" position. Set the range switch to "high". Set the main tuning dial somewhere in the 2,000-2,500 kc. region. A suitable spot would be 2,333.333 or 2,250 kc. Now switch back to the "crystal check" position and observe the resulting beat note heard in the earphones. The note should not exceed 150 cycles.

Another and somewhat more suitable test is to set the frequency meter to any crystal check point in the "high" range. Zero in with the corrector in the prescribed manner. Set the function switch to the "heterodyne" or "operate" position. Do not disturb the corrector setting. Now, move the main tuning dial to the next check point listed in the calibration book. Set the function switch back to the "crystal check" position; a tone will be heard in the phones. Note the main tuning dial reading and tune the dial for an exact zero beat. If the difference in the two dial readings exceeds 1.2 divisions, the calibration is not good.

On the low band this same test should indicate a maximum error not greater than 1.8 dial divisions. If the error is greater than this, your instrument is bad. The smaller the error the better the condition of your instrument.

At this point I would like to inject a third test utilised by the government to determine the quality of a BC221. This test involves a second instrument, preferably a lab. instrument of better quality, but it can be a second BC221, the quality of which is beyond question. The easiest method involves the use of frequency meter type receivers such as the 51J, the R338, R389 or R390 series.

To check a BC221 with these auxiliary devices, there are five specific test points on the low bands. These are: 130 kc., 160 kc., 190 kc., 210 kc. and 240 kc. On the high band there are four reference points tested. These are: 2,100 kc., 2,400 kc., 2,900 kc. and 3,800 kc. The deviations in dial divisions, when checked at any of these specification points against an external standard, should not exceed half dial division as measured with the vernier scale in order to be considered an excellent instrument. In effect, an instrument to be certified for F.C.C. purposes must meet this particular test. Those whose deviations reach one dial division are considered good and those greater than $\frac{1}{2}$ dial divisions are considered poor.

MAXIMUM FREQUENCY ERROR

Since the principal application of the BC221 is to measure radio frequencies so as to determine edge of band positions in compliance with tolerances imposed by the F.C.C., it follows that the ordinary error found in the BC221 should be both understood and rectified.

The technical manual TM11-300 is the source of the following statistics on possible frequency errors.

Cause	Error
Small shocks (caused by handling and thrust on the dial and panel)	100 c/s.
Action of locking the dial	30 "
Warming up	100 "
Change of load on antenna	
drop	50 "
A drop of 10% in voltage, or of 5°C. in temperature	325 "
Error in calibration	500 "
Error in crystal frequency	250 "
Total Error	1355 c/s.

This represents 0.034% error at 4,000 kc. and is the theoretical maximum. Many of the errors may actually cancel each other rather than be additive. Also the error is less at lower frequencies. For example at 2,000 kc. it is only 885 cycles, and 125 kc. only 180 cycles. The average error that can be expected would be closer to 0.015% than 0.034%.

With these error percentages in mind consider the problems of checking band edges or setting a v.i.o. on the Army M.A.R.S. frequency of 3,260 kc. A maximum error 320 cycles is allowed by M.A.R.S. If the error is the maximum, 0.034%, the deviation can be as great as 1,120.3 cycles. However, as pointed out before, the error is more likely to be in the order of 0.015%—presenting the possibility of a deviation 494.25 cycles, still in excess of the maximum permissible error.

IMPROVING ACCURACY

How then may we employ the BC221 as a reliable tool for measuring our frequency? The answer lies in a system known as the additive or subtractive system which recognises that the

* Reprinted from "CQ," August 1962.

1—Dudley, R., "Calibrating a BC221 Frequency Meter," "QST," March 1959, page 40.



UNIVERSAL SOUND

DYNAMIC MICROPHONE Model 603

A Product of Italy

Omnidirectional.
Output: —50 db.
Response: 50-12,000 c.p.s.
Impedance: 50,000 ohm, 250 ohm or 60 ohm.
Dimensions overall: 40 x 40 x 98 mm.
(1-9/16" x 1-9/16" x 3-13/16").
Accessories: Table base.

Model 603 is a Dynamic Microphone ideal for music, speech and particularly magnetic recording. Can be used on stand or on a small table base.

Smart square shaped aluminium pressure cast case with stainless steel wire mesh.

Sturdily built and beautifully finished. Impedance can be easily stepped down from high (50,000 ohm) to low (60 or 250 ohm) impedance.

Retail Price: £14/0/0
Plus Sales Tax £1/9/2

Marketed by **ZEPHYR PRODUCTS PTY. LTD.**

58 HIGH STREET, GLEN IRIS, S.E.6, VICTORIA

Phones: 25-1300, 25-4556



COLLINS RADIO COMPANY (A'SIA) PTY. LIMITED

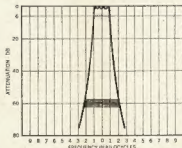
presents the new low cost

COLLINS F455 FA-21 455 Kc. MECHANICAL FILTER

This new Filter will find wide use in Commercial and Amateur Single Sideband Transmitters and Receivers.

Based on innovations in design and manufacturing, the new Filter has the same stable steep-skirted selectivity as all Collins Mechanical Filters, with a nominal 8 db. bandwidth of 2.1 kc. and a 60 db. maximum bandwidth of 5.3 kc., providing a shape factor of just over 2.5 to 1.

In addition to high selectivity, the new Filter displays a flat-topped passband and other performance features characteristic of the basic design, simplicity, reliability and compactness of the Mechanical Filter. The Filter is electrically and mechanically stable, and will not age, break down, or drift as a result of extreme temperature or long, continuous service. Frequency shift, for example, holds 10 ppm/°C. over a —25°C. to +85°C. range. Passband response variation or ripple is 3 db. max. and transmission loss is only 9.5 db.



Price £15-19-3 plus £1-12-0 Sales Tax

Available from our
authorised dealers:

SHEPARD'S TELEVISION CO.
12a Gays Arcade, Adelaide. Phone: 8-1384

UNITED RADIO DISTRIBUTORS
175 Phillip Street, Sydney. Phone: 28-3718

and all other **COLLINS RADIO CO. (A'SIA) PTY. LTD.**
States from: 34 Queens Road, Melbourne, Vic. Phone 26-3643

The first mechanical alteration made in your BC221 involves cutting into the plate circuit of the multi-grid mixer and inserting a conventional 2.5 mH. r.f. choke as shown in Fig. 1. The plate itself should couple through a small 100 pF. capacitor to a new output connector. If you wish to alter the panel you may insert a suitable r.f. connector jack such as a B.N.C. fitting.

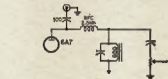


Fig. 1.—Modification made in the plate of the mixer tube that will enable the additive-substrate system of frequency measurement to be used. This can provide a great increase in frequency meter accuracy. The mixer tube type will vary from model to model and may be a 6A7, 6X4 or a 7B1.

Insertion of the r.f. choke and capacitor modifies the original circuitry so that the multi-grid mixer can produce sums and differences of both the crystal fundamental or its harmonics as well as the v.f.o. fundamental and its harmonics. Thus you can use the low frequency side of the BC221 where the calibration book shows each 1/10 of a kc., and by doing so, with proper recognition of the beat notes, the accuracy can be improved by a factor of 10, or more.

The function switch still determines the mode of operation. It is normal in the "heterodyne oscillate" position and you may now heterodyne in the "crystal check" position as well.

To illustrate the additive or subtractive method, suppose that you wanted to measure 2,360 kc. The second harmonic of the crystal (2,000 kc.) is beat with the second harmonic of 180 kc. to give the frequency 2,360 kc., i.e. $(2 \times 1,000) + (2 \times 180) = 2,360$ kc. This also gives rise to other signal combinations but they will be 180 kc. removed from 2,360.

The accuracy of measurement is even better if you subtract, as an illustration, the 360 from the next one megacycle and set your low frequency range to the difference, or 640 kc. By this so-called subtractive system the error is halved.

There are slight complications in this method which are helpful rather than troublesome if they are used to advantage. The full procedure is to turn the BC221 on and let it warm up for one hour with the band switch on "low." To measure 2360 kc. set the dial to

check point 181.82 kc, and zero beat the "corrector" knob. This can be done, at least once, as soon as the frequency meter is tuned on in order to determine the frequency drift during the warm-up period. This rate of warm-up is handy information in case it is desired, subsequently, to make a measurement with a cold frequency meter. (The direction of magnitude and drift should be noted.) Each vernier division will be approximately 2.7 cycles on the fundamental or 5.4 cycles for 2,360 kc. measurements.

Now set the dials to the setting given for 180 kc., the sub-harmonic of 360 kc. While listening on the frequency meter headphones, slowly rotate the main dial one complete revolution to the right and then to the left. You will hear a number of "birdies" which those little "birdies" is actually a check point accurate to 0.0001%. If you use a 12" piece of wire for a small antenna and set your frequency meter to 180 kc. dial setting, then you could turn on the oscillator in your transmitter and it is within 0.0001% of the correct frequency. If you slowly move the BC221 dial a one-half turn to the right or left. You will note that while the "birdies" are still present, the beat note between your transmitter and the frequency meter can be heard over one complete revolution of the vernier unit. In fact, it will be difficult to find exact zero beat since it covers 4 to 5 vernier divisions.

The system described above is at first confusing due to the many beat notes heard, however, with practice, measurement of various frequencies can be made with little difficulty if you will remember that the beat notes in which you are interested change very slowly in comparison with the spurious beats.

LOCATING THE ZERO BEAT

Three methods for finding the exact zero beat can be employed. One is the use of an external "magic eye" tube to be discussed later, a second is to take the centre of the dial readings for the lowest audio beats, and the third way is to plug an output meter into the phone jack.

The zero beat point can be recognized more easily if the low frequency response of the audio amplifier is improved. The low frequency response of the audio portion of the BC221 can be greatly improved by the use of a high quality 8,000 to 250 ohm output transformer in those models that use output transformers and by connecting a 10 or 20 μ F. 20 volt electrolytic cap-

acitor from the cathode of the audio stage to ground. In some models it is necessary to disconnect the audio stage cathode from the heater connection (ground) and to insert a $\frac{1}{2}$ watt cathode bias resistor of 350-500 ohms. The original bias connection presupposed the use of batteries which provided the bias and most Amateurs use these meters with a.c. supplies.

TIME SAVING GRAPHS

Interpolation between the frequencies listed in the calibration book is awkward and time consuming. You will save a great deal of time and obtain better accuracy if you make up a special graph or in reality two graphs for each major frequency in which you are interested. In the illustration of a 2,360 kc. one graph should cover the high band position using one square per vernier division on one axis and one square for 10 cycles of frequency (2,357.5-2,362.5 kc.) on the other axis. Label this graph "rough measurement". For the additive method the second graph will extend to the right and could have 10/10 dial divisions per square on one axis and 10 cycles per square for frequency on the other axis. The graph line will cover the same 2,357.5-2,362.5 kc. Place red marks on the curve at plus 0.01 and minus 0.01%. The portions of the curve between 0.0075 and 0.01 may be drawn with red ink. The portion of the band with black ink. The red curve then suggests the accuracy limits.

ACCURACY OF THE MODIFIED BC221

Summarising the maximum possible accuracy of the BC221, the best possible conditions would be to have a constant room temperature, a constant B voltage, a constant A voltage or filament supply, a quartz crystal which has been checked at plus or minus one cycle of WWV at 5 Mc., a frequency meter that has been warmed up to reach thermal equilibrium, and finally graphs which have been substantiated by spurious harmonic points.

Assuming these ideal conditions then the maximum errors that you could get would be: (1) the accuracy of the crystal 1/5 of a cycle per megacycle; (2) a calibration curve error not greater than 8 cycles in the low range; (3) a mechanical dial back-lash error of 4 cycles, and (4) a zero beat error of 5 cycles or less. Adding these together could come out to at least 0.0002% theoretical error.

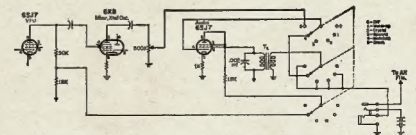


Fig. 2.—Skeletal diagram showing the modulation set up in the BC221AK series. The output transformer, T1, is used as the oscillator transformer in position 4. Audio taken from the plate of the 6SJ7 is fed to the junction of the two plate resistors in the 6SJ7 v.i.o. There are two more switch sections used to handle voltage distribution but these are not shown.

2—Grammer, G., "The Additive Frequency Meter," "QST," May 1949, page 32. Riley, C. L., "Interpolation Frequency Measurements with the BC221," "QST," January 1950, page 41.

PRACTICAL IMPROVEMENTS TO THE BC221

Several modifications enhancing the value of the BC221 have appeared in magazines³ over the past decade.

Modulation.—The most important improvement is perhaps the easiest one to accomplish and has to do with using the BC221 as a signal generator. This change is accomplished by merely adding tone modulation to the local variable frequency oscillator and either of two ways can be employed to gain this end.

First, we can add a small audio oscillator transformer wired in as is shown in Fig. 2, the circuit of the BC221AK. This involves a change in the function switch which permits the output of the variable frequency oscillator to be modulated approximately 375 cycles. The function switch in the BC221AK reads "off, warm-up, crystal, operate, modulate, check". In the "off" position, both the A and B battery circuits or power supply are disconnected. In the "warm-up" position, volts is connected, through the switch built into the phone jack, to energize the diaments in the three tubes.⁴ The B battery circuit is closed, subsequently, in the "crystal" position, energizing all tubes with the exception of the variable frequency oscillator. In the "operate" position, the B voltage is applied to all tubes with the exception of the crystal oscillator portion of the multi-grid mixer.

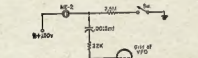


Fig. 2.—A simple relaxation type oscillator developed by DL4VG (W8YUE). Care must be taken to keep the leads short.

The "modulate" position, in addition to converting the audio amplifier circuit to an audio oscillator, the operation switch closes the B voltage circuit for all tubes with the exception of the crystal oscillator, and the plate circuit of the variable frequency oscillator is now connected to the modulator. In the "check" position, the audio amplifier circuit is restored to normal and the B voltage is fed to all tubes. This modification involves the acquisition of a small audio transformer and two resistors in addition to changing the function switch as shown in Fig. 2.

A smaller modulating device, but without the complexity of the AK circuit, is one which makes use of a simple NE-2 neon lamp and several other components. This circuit is shown in Fig. 3. In operation, the switch is closed to provide a 400 cycle tone on

the carrier of the local variable frequency oscillator.

Null Indicator.—For those readers requiring a simple null indicator or zero beat detector, a 6ES or 6GS tuning eye tube, connected as shown in Fig. 4, will provide a positive means for indicating the low frequency beat notes. This device may be constructed externally to the BC221 and connection made through the phone jack if you don't wish to alter the BC221.

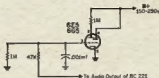


Fig. 4.—An excellent null indicator makes use of a 6ES or 6GS "tuning eye" type tube. The circuit, suggested by W8MW, permits the operator to observe low level signals that are inaudible.

Harmonic Generator.—A most useful addition to the BC221 is the harmonic generator using a 6AK5 miniature tube as shown in Fig. 5. This can be assembled on a small bracket and fastened to the chassis of the original BC221 and should not interfere with the function of the original controls in the slightest.

Harmonics, useful through 300 Mc., will be generated by this device, and for those working with frequencies in the order of 2 and 1½ metres this is a very desirable addition to the original BC221.

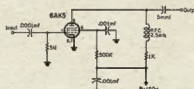


Fig. 5.—A harmonic generator to improve performance in the v.h.f. range may be added to the BC221.

BC221 AS AN AUDIO SOURCE

The BC221 can be used as a source of reasonably good audio frequency sine waves by turning on the low frequency portion of the BC221 and looking for the 10,000 cycle spread between 990 and 1,000 kc. You will find that this takes up over 800 readable divisions

with approximately 12 cycles per division. Therefore, with the meter in "check" position, the resulting beat note will be a reasonably, accurately known audio frequency. To check this, tune in WWV on your receiver and feed the receiver output to the horizontal amplifier of an oscilloscope. With the frequency meter set to 996 kc., the 4 kc. beat note which results should form a perfect circle or an ellipse when fed to the vertical deflection plates of the oscilloscope.

BC221 AS A V.F.O.

The BC221, with the aid of suitable isolation amplifiers and then untuned voltage amplifiers, makes an excellent adjunct to either your sideband transmitter or it may serve directly as a v.f.o.

A typical application would involve taking the output of the BC221 with its precisely known control of frequency and feeding it into a cathode follower and thence into two or more stages of broadly tuned 6CL6 multipliers or voltage amplifiers from which point the output will in all probability be sufficient to directly feed a 2E26 or 5763 or 6146. Thus the BC221 is capable of being a tremendous v.f.o. for a sideband exciter.

More details on this type of application may be found by referring to the "Radio Handbook" published by Editors and Engineers.⁵

Some further information may be gleaned from the previous articles listed below.

BIBLIOGRAPHY

- Chamberlain, N. K., "Identifying Frequency Meter Harmonics," "QST," September 1962, page 34.
- Dudley, B., "Adding a Bandspread Range to the BC221," "QST," August 1953, page 38.
- Nebel, R., "Detonating the BC221," "CQ," December 1950, page 26.
- Dorsey, M., "Measuring Frequency with the BC221," "CQ," December 1950, page 29.



WORLD AMATEUR CALL SIGNS

The Federal Treasurer has for sale as usual at 21¢ post paid, recent back numbers of "Call Book Magazine." Copies available at the moment list American Amateurs only, but the "foreign" edition, listing all Amateurs in the world except Americans, may be available by the time "A.R." goes to press. Apply to the Federal Treasurer, Bob Boase, VK3NI, 50 Cardigan St., Carlton, Vic.

⁵—"Radio Handbook," Editors and Engineers, 11th ed., page 446.

³—Pitts, J. E., "Tone Modulating the BC221," "CQ," August 1949, page 14. "Compact Power Supply for the BC221," "CQ," April 1947, page 30. Grayson, K. B., "Surplus," "CQ," April 1959, page 79. Wood, W., "Null Indicator for the BC221," "QST," May 1959, page 66. Carlson, B., "Adding Tone Modulation to the BC221," "QST," May 1948, page 68. Cross, H., "Using the BC221 Frequency Meter at V.H.F.," "QST," January 1950, page 46.

⁴—This is a safety precaution. The front panel lid cannot be closed if the phone plug is inserted. When the phone plug is removed, the A batteries are automatically disconnected, thus preventing accidental discharge.

CHOOSE THE BEST—IT COSTS NO MORE



O. T. LEMPRIERE & CO. LIMITED, Head Office: 27-41 Bowden Street, Alexandria, N.S.W., and at Melbourne, Brisbane, Adelaide, Perth.

TECHNICAL TOPICS* BY PAT HAWKER, G3VA

- ★ "Vive La Lash-up"
- ★ 14 Mc. Mini-Dipole
- ★ Two-Stage Clamping

- ★ Bridged-T Crystal Filter
- ★ Signal Injector
- ★ Low-Cost Audio Filters
- ★ "One-Knob" A.m. Transceiver

- ★ V.h.f. Across Mountains
- ★ The Simplest Modulator
- ★ Prototype Construction

THE other day a youngster just becoming interested in Amateur Radio called round and asked if he could see the equipment. As is the way with these things, it was just at a time when a lash-up 1.5 Mc. transmitter was going through a period of drastic modification. The sight which met the youth's astonished gaze looked like something out of the early 'twenties, with trailing wires, twisted connections, meters and extra components resting on the bench, all forming a most glorious hay-wire effort (the home-built gear at G3VA is not exactly constructors' competition material at the best of times, but that day it really excelled itself). Clearly, this was not how he had imagined an Amateur station—and not at all like those tidy and impressive shacks in the magazines.

But after he had departed (disillusioned?), we began to wonder whether there is not a modern tendency among Amateurs to prize too highly the "professional" appearance: the control panel with every hole symmetrical and correctly filled; all control knobs carefully matched; every interconnecting wire cabled up and out-of-sight. Such equipment, of course, has much in its favour, and often represents great skill and forethought on the part of the constructor; but sometimes it may conceal a rather inflexible station which cannot readily be modified to take into account technical developments or a shift of interest on the part of the owner.

this country was once officially classed as "experimental."

This is certainly not an attack on the careful constructor—far from it. But we feel that many Amateurs are deterred from attempting much home-brew equipment because they know that with limited tools or constructional experience, or lacking the necessary temperament, they will not produce equipment looking like a factory-built job. This, we suggest, is a sad reflection on our sense of priorities and could lead to our failing to enjoy much of the very best in our hobby.

SYMMETRICAL CRYSTAL FILTERS

Most of the professional texts on i.f. crystal filters devote considerable space to the bridged-T type of filter (sometimes called "combined crystal and mutual inductance coupled circuits"). With a single crystal two points of infinite rejection can be placed on each side of the crystal frequency, thus providing a symmetrically shaped response curve roughly similar to that

It was therefore with considerable interest that we noted in the German "Funk-Technik" (No. 6, 2 March, 1962), the use in an Amateur-band receiver of a variable bandwidth filter which appears to combine both bridged-T and half-lattice techniques, using three 467 kc. crystals.

In the article, it is said that this filter (see Fig. 2)—developed by the Valvo firm (type AP1001/70)—is fairly easy to construct, though some care is needed in the choice of values for C20 and C27. The trimmers compensate for the crystal capacitances and the bandwidth is controlled by C22. Unfortunately, no response curves are included in the article.

Such a filter avoids the problem of staggered crystal frequencies as well as providing variable bandwidth, and we feel sure that members would be interested to learn of the results achieved by anyone experimenting with this type of circuit.

Another unusual feature of this particular German design for a home-built receiver is the inclusion of a built-in two-metre converter.

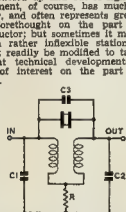


Fig. 1.—Basic bridged-T crystal filter. C1 and C2 are adjusted for maximum response at the series-resonant frequency of the crystal. C3 adjusts the position of the maximum rejection points in some designs the series resistor R is omitted and the mutual coupling arranged as in an i.f. transformer.

Few experimental designs are likely to work well at first go, and it is only on v.h.f. that results are greatly affected by the actual construction. The production of original prototypes, no matter how rough so long as they do what was intended, can give great satisfaction. All credit to those who afterwards go on and produce a neat and really well-built working model, but we should not consider this the prime aim of the Amateur station, which in

* Reprinted from R.S.G.B. "Bulletin," June, '62.

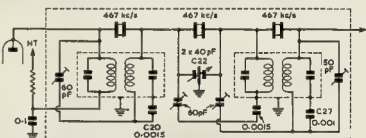


Fig. 2.—Valvo variable bandwidth crystal filter using three 467 kc. crystals. ("Funk-Technik")

of the more familiar two-crystal, half-lattice bandpass filter. The basic circuit is shown in Fig. 1, though some variations can be noted between different authorities.

Although this type of filter was successfully used in some wartime Service receivers (R201 and R206) as a plug-in unit (see a good description in Proc. I.E.E., Vol. 94, Part 3A, 1947). It never seems to have been widely adopted for Amateur receivers.

A possible drawback is that for optimum performance the inductance of the i.f. transformer coils and the mutual coupling have to be specified, and the series resistance (sometimes omitted) also affects results (typical value about 3,000 ohms). Yet clearly a useful filter can be made, quoted performance figures for one of the Service 465 kc. filters being: bandwidth—8 db, 2.5-3 kc.; bandwidth—60 db. (infinity points), 4.5-11 kc.; and better than -40 db. at lobes.

THE SIMPLEST MODULATOR

For those who run c.w. only transmitters, but who feel the urge to make an occasional phone contact without the expense of a high power modulator or a modulation transformer or even any extra h.t. supply, the following idea, though not new, may be of interest.

Almost nine years ago, W8LNN showed ("QST," Sept. 1953) how a very simple 6SL7/6Y6G modulator could be just plugged into the usual keying jack on many transmitters. Now, in "QST" (April 1962), W1PH revives the idea for a 1.8 Mc. rig. Fig. 3 shows the basic details.

When the modulator is inserted in the p.a. cathode lead it provides principally grid-bias modulation, although there is a small amount of accompanying anode and screen-grid modulation. Almost any p.a.—triodes, tetrodes or pentodes, single-ended or push-pull—



Hallicrafters Model SX117 Receiver

The SX117 is a new triple conversion heterodyne type communication receiver with crystal controlled high frequency oscillator on all ranges

FEATURES:

- ★ A high order of mechanical and electrical stability.
- ★ Transmitter-type V.F.O.
- ★ Constant tuning rate.
- ★ Back-lash free tuning mechanism.
- ★ Crystal controlled 1st and 3rd conversion oscillators.
- ★ Selectable sidebands.
- ★ Sensitivity less than 1 microvolt.

- ★ Selectivity variable in three steps from 500 to 5,000 cycles.
- ★ Product detector for S.S.B./C.W., envelope detector for A.M.
- ★ I.F. type noise limiter.
- ★ V.F.O. can be used as crystal-locked oscillator.
- ★ Spurious responses down 50 db.
- ★ Audio inverse feedback.

SX-117 is shipped with crystals to cover: 3.5-4.0 Mc., 7.0-7.5 Mc., 14.0-14.5 Mc., 21.0-21.5 Mc., 28.5-29.0 Mc.

Receiver can operate on most frequencies from 3 Mc. to 30 Mc. with use of proper crystals and with accessory unit HA-10 can be extended downward from 3 Mc. to 85 Kc.

A "T" notch is provided to give up to 50 db attenuation to an unwanted heterodyne or c.w. signal that may appear within the i.f. passband. Sensitivity is less than 1 microvolt on a.m., and less than $\frac{1}{2}$ microvolt on s.s.b./c.w.

TUBES AND FUNCTIONS:

6DC6—R.f. Amplifier.
6EA8—1st Mixer, Cathode Follower.
12AT7—Crystal Oscillator.
6BA6—1st I.f. Amplifier (6-8.5 Mc.).
6BE6—2nd Mixer.
6EA8—Auxil. Xtal Osc. (not supplied)

6EA8—V.f.o., Cathode Follower
6DC6—2nd I.f. Amplifier (1650 Kc.).
6EA8—3rd Mixer, S.b. Switching Oscillator
6BA6—3rd I.f. Amplifier (50.75 Kc)

6AU6—100 Kc. Calibrator.
6BE6—Product Detector, B.f.o.
6BN8—A.m. Detector, A.v.c. Amplifier, A.v.c. Rectifier.
6GW8—1st Audio Amplifier, Audio Output.

Front Panel Controls and Functions: R.F. Gain, Audio Gain, Tuning, Function Selector (Upper/Lower S.S.B., A.M., On/Off Switch), Cal. Reset, Selectivity, Notch Freq., B.F.O., A.N.L./C.A.L., Band Selector, Phone Jack, Preset Selector.

Rear Chassis: Coax Antenna Connector, Audio Output (3.2 and 500 ohms), Line Fuse, Ground Lug.

Cabinet Size and Weight: 15" wide, 7" high, 13" deep. 18 lbs. net weight, 21 lbs. shipping weight.

Power Supply: 105/125v. 50/60 cycles a.c.

W.F.S. ELECTRONIC SUPPLIES CO.

225-7 VICTORIA RD., RYDALMERE, N.S.W. Phone 08-1715

Interstate Agents:—

ELECTRONIC SERVICES PTY. LTD., 10b Douglas Street, Noble Park, Vic.

TELEVISION & RADIOTRONICS PTY. LTD., 11a Gays Arcade, Adelaide, S.A.

NEIL JAMES PTY. LTD., 24 Brisbane Street, Perth, W.A.

GENERAL IMPORT DISTRIBUTORS PTY. LTD., 135 Lutzow St., Wellers Hill, Brisbane, Qld.

The transmitter is first tuned up as for c.w. and loaded to normal power; the modulator is then plugged in. The

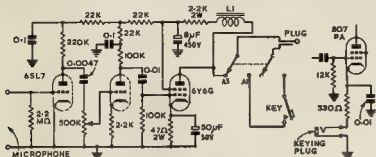


Fig. 3.—WIPH's version of the WELNN "simplest modulator". L1 is a small filter choke of about 15 H. ("QST")

p.s. anode current should then drop to about half the previous reading—and this is the correct condition for phone.

The small filter choke removes the a.f. component from the h.t. supply for the two-stage speech amplifier, in this case a 8SL7. The h.t. supply for the p.a. (from which the h.t. for the modulator is series derived) is about 400-600 volts.

CONDENSED ROTARY DIPOLE FOR 14 Mc.

The rotating dipole can still be a most useful aerial for those who want to radiate signals to all points of the compass without the constructional and adjustment problems of a multi-element beam. But for 14 Mc. it is often difficult to fit a rotating 33 ft. element into the space available.

In "CQ" (March 1962) K2EEE describes the construction of a mini-dipole (Fig. 4) of about 16 ft. overall length, using two 7.5 μ H. loading coils (approximately 11 turns on 23" diameter former, 6 t.p.i. using U.S. No. 12 or 14 wire).

Final adjustment is made by two end lengths (each 2 ft. long) of $\frac{1}{2}$ " tubing, which slide into the main $\frac{1}{2}$ " tubing. K2EEF's centre hardwood mounting is 28" by 24" by $\frac{1}{2}$ ", and at the two coil mounts, the ends of the $\frac{1}{2}$ " tubing are flattened and sandwiched between two 6" by 2" polystyrene plates with the coils connected to the inner mounting screws. The dipole need be rotated by only 90°, or even less if necessary.

SIMPLE SIGNAL INJECTOR

More and more service engineers are finding that a simple multivibrator type of generator can be a useful aid for stage-by-stage tests of receivers—

particularly those using transistors. We have an idea that such an accessory would also be pretty useful to constructors. It is a logical extension of the old dodge of putting your finger on the grid and listening to the resulting hum, but with the great advantage that it produces a signal extending well into the r.f. range, so that one need not stop at the detector stage.

Design for Electronics (Newnes), this can comprise a number of valveholders, preferably with the heaters pre-wired (but watch out for the odd octal valves which do not use pins 2 and 7 for this purpose); a long tag strip (or one on each side) for locating resistors, fixed capacitors, transistors, etc; space for rapid mounting of "iron" components, electrolytic capacitors, etc.; plenty of holes available for mounting any other components; either a pre-drilled vertical panel or a series of mounting brackets for variable capacitors, potentiometers, etc.; suitable terminations for power-supply leads, possibly with bus bars running the length of the chassis. One idea is to have p.c. board permanently attached to the pins of the valveholders with colours corresponding to the usual colour code (brown pin 1, etc.).

For lighter work, and particularly for small transistor units, a very convenient form of construction is described in one of the leaflets issued by the Mullard Educational Service (No. 20, "The Mullard Pegboard Circuit System"), devised to enable experimental and permanent circuits to be quickly and cheaply constructed for demonstration purposes.

The basis of this system is soft pegboard (recognisable by its light colour from the darker, rather brittle type) in conjunction with numbers of cylindrical brass pillars $\frac{1}{4}$ " in length and $\frac{3}{16}$ " in diameter, tapped at both ends with a 6 BA thread (the pillars are cut from standard $\frac{3}{16}$ " brass rod and tapped). These pillars can be just pushed into the pegboard (for what is

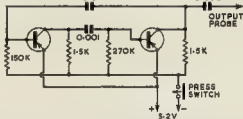


Fig. 5.—Signal injector for servicing and testing, built into unit resembling a ball-point pen.
("Radio-Electronics")

RAPID PROTOTYPE CONSTRUCTION

Those who are interested in trying out new ideas and circuits soon feel the need for methods of speeding up the assembly of prototypes without incurring the expense or drilling of individual chassis.

After the initial ideas have been committed to paper in the form of a circuit or possibly a rough sketch of layout based on available parts, comes the time for the first hook-up. At this stage it can be very useful to have available some partly-wired chassis kept for this purpose.

To adapt some of the ideas for a universal experimental chassis put forward in R. H. Garner's "Mechanical

sometimes called "temporary permanent" hook-ups), or firmly attached to it by means of 6 BA nuts with washers or solder tags. These pillars are then used as tag points for mounting light components and wiring, or for attaching heavier parts; if the component mounting holes do not exactly match the pegboard hole spacing, the pillars can usually be sloped a little to accommodate the difference.

Wiring can either be all on the component side or concealed on the opposite side of the board. This general technique is, of course, most suitable for lower frequency circuits where the effect of the brass rods is negligible; for r.f. work it might be advisable to use the rods solely for mounting purposes, possibly in conjunction with conventional tag strips.

More complicated equipment (Mullard mention a square-wave generator as an example) can be made by assembling two layers of pegboard above one another.



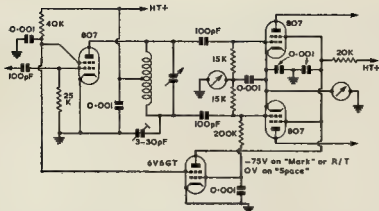


Fig. 5—VP3MC's two-stage clamp circuit.

TWO-STAGE CLAMPING

The use of screen grid clamping valves with grid current biased p.a. stages has been popular for a number of years with little variation of circuit details. Now, however, VP3MC sends along information on an arrangement which he has been successfully using for some time and which he feels may be useful to others.

This differs from the conventional system in that the clamping action is applied simultaneously to the screen grids of both the buffer and the p.a., resulting in much lower standing current during "key up" ("space") con-

ditions, providing also a useful safeguard during tuning up of the earlier stages or during loss of drive.

"Should a common gridleak resistor be used for the p.a. valves, the blocking bias for the clamp valve would be taken from this resistor, and if the point is at zero r.f. potential the isolating resistor would not be required. Compared with a triode-connected clamp, the improved action on the p.a. is because the screen grid of the clamp valve is at a higher potential during 'space' conditions, but is low enough to effectively clamp the buffer stage."

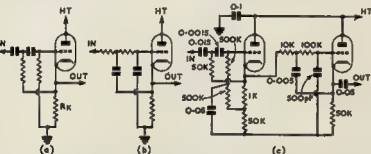


Fig. 7—A.F. filters without "wound" components: (a) basic high-pass filter; (b) basic low-pass filter; (c) practical design for bandpass filter using cascaded high and low-pass filters. ("Electronics" and "DL-QTC")

ditions (thus incidentally creating less "noise" radiation) and the need for both stages. Fig. 6 shows his circuit, though the scheme could be readily adapted to other transmitters.

VP3MC writes: "The screen grids of the p.a. are fed from the main h.t. via a 20K resistor. The anode of the clamp valve is tied to the screen grids of the p.a., and the screen grid of the clamp valve connected to the screen grid of the buffer. At VP3MC the grids of the p.a. valve are fed via grid-blocking capacitors with individual gridleak resistors of 15K ohms each. The blocking bias for the clamp valve is therefore taken from the grid of only one of the p.a. valves, via a 200K ohms 1/2 watt resistor connected closely to the p.a. grid lead for the purpose of isolation, so as to counter any unbalancing effect. On c.w. the v.f.o. is keyed, and this two-stage clamp holds both buffer and p.a. down to very low values of

tended to depend upon "wound" components such as toroids and audio chokes. In "Electronics" (April 10, 1959), it was shown that low-cost high-pass (Fig. 7a) and low-pass (Fig. 7b) filters could be constructed using a cathode-follower valve in conjunction with three resistors and two capacitors; two such filters can be cascaded for bandpass characteristics.

The original article gives full design procedure for determining component values, though like almost all filter design this involves a fair amount of mathematics. However, we recently noted in "DL-QTC" (March 1962) a practical example for Amateur telephony: see Fig. 7c. This has a pass-band of about 250-3,000 c/s.

ONE-KNOB A.M. MOBILE TRANSCIVER

The use of a single v.f.o. for transmission and reception is by now well favoured among a.s.b. enthusiasts. But there is, of course, no reason why the same principle should not be applied to a.m. set-ups. In "DL-QTC" (March 1962) DJ3YN describes a compact 3.5 Mc. "Einknopf" mobile rig which uses an EF80 e.c.o. as a basis for the transmitter mixer-type exciter and also for the receiver local oscillator; transmitter and receiver both being automatically tuned to the same channel. Fig. 8 shows more clearly than words how this is achieved. A simple adaptor, using a single 6U8A, to convert existing equipment to simultaneous transmitter and receiver tuning is described by W6EOT in "QST," May 1962.

IONOSPHERIC FORECASTING

An article in Proc. I.E.E. (March 1962) explains the new method of Ionospheric Forecasting now being used by D.S.I.R. This is based on the identification of "epochs" during which corresponding conditions prevailed in past years, rather than plotting completely new forecast maps as done previously. It has been found that it is usually possible to identify some period within the previous ten years when almost identical radio conditions occurred. One result of this new system, it is said, is a great increase in the accuracy of predictions made several months in advance.

KNIFE-EDGE DIFFRACTION PROPAGATION

V.h.f. enthusiasts will probably tell us that there is nothing new in the idea of getting signals across a mountain range by aiming their beams accu-

(Continued on Page 16)

LOW-COST AUDIO FILTERS

There are a number of applications in both receivers and transmitters for low-pass, high-pass and bandpass audio filters which give a "roll-off" of the order of 12 db/octave outside their pass range. Most such filters have

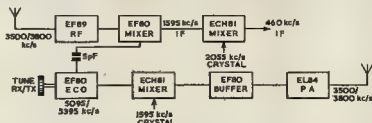


Fig. 8—Part of the DJ3YN "one-knob" a.m. mobile transceiver showing how receiver and transmitter are tuned automatically to the same channel by the single e.c.o. ("DL-QTC")

Scouts who took part say . . .

"SUCCESS OF JAMBOREE-ON-THE-AIR DUE TO HAMS"

Despite the fewer Amateurs and Scouts who took part in the Fifth Jamboree-on-the-Air, it proved to be one of the most successful. Contacts established were more varied and of a generally higher quality than last year.

The success of the Jamboree was due to the co-operation, goodwill, and enthusiasm of Amateurs everywhere. Many so caught the spirit of the activity that they spent long periods seeking contacts for the Scouts who visited their shacks. There were, unfortunately, the odd instances when Scouts who had arranged to take part did not turn up, but, happily, these were in the minority. Two Victorian Amateurs were instrumental in making the Jamboree run smoothly. They are John Woodburn (VK3AGD) and Lin Brown (VK3ARL), Branch Organiser and State Co-ordinator for Victoria, respectively. Their unflagging enthusiasm, patient attention to detail, and "Scout spirit" was appreciated by all who had dealings with them.

There were sixty-nine Scout Groups in Victoria operating from fifty Amateur Stations during the Jamboree week-end. A notable feature was the increased number operating portable from Scout Halls, and the number of Amateurs and Scouts who took part for the first time.

Approximately 1,000 Scout visitors attended these stations and they all thoroughly enjoyed themselves. They exchanged greetings, arranged for penpals, chatted each other about their towns and the weather, and generally had great fun.

600 contacts were made, and 450 of these were Group-to-Group. Included in the 600 were 71 DX contacts. These figures are not truly indicative of the results, as more than 50 stations, oper-

ating with Scouts, were monitored during the week-end.

Increased activity Interstate shows the interest which is gradually spreading throughout the Commonwealth. The encouragement given by the Wireless Institute of Australia, in assisting with preparations, publicity, and in a more practical way, by setting up official stations and operating for the benefit of Scouts, was greatly appreciated.

It was stimulating to note that a number of v.h.f. stations took an active part this year. It would contribute considerably to the Jamboree activity if the v.h.f. boys could be persuaded to combine their annual field day with the Jamboree next year, and thoughts on this matter would be appreciated.

One of the most widespread criticisms heard during and after the Jamboree was that it was not well publicised overseas. Here is an opportunity for DX enthusiasts to do a good turn for the Boy Scouts by talking about the Jamboree to their DX contacts during the next twelve months and arranging skeds when Scouts can be present in their shacks.

The earnest and excited activity during the forty-eight hours of the Jamboree is evidence that interest is increasing. Scout leaders have found it instructive, fascinating, and a practical way of bringing home to their Scouts the meaning of the fourth Scout law: "A Scout is a friend to all and a brother to every other Scout, no matter to what country, class or creed the other may belong."

In addition to this, the Jamboree-on-the-Air has other far-reaching possibilities. It may well be a source of future Amateurs and members of the W.I.A. The formation of Youth Radio Clubs, in Scout Groups, similar to those

at present being promoted throughout all Divisions of the W.I.A. would help ensure this.

The Jamboree-on-the-Air was an indubitable success, and the thanks of the Boy Scouts Association are extended to all who helped to make it so.

-L. D. Marmo, "Jamboree-on-the-Air" Publicity Officer, Boys Scouts Association, Victorian Branch.

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.



Manuscripts should preferably be typewritten but if handwritten please double space the writing. Drawings will be done by "A.R." staff provided that the article is illustrated.



Photographs will be returned if the sender's name and address is shown on the back of each photograph submitted.



Please address all articles to the

EDITOR "A.R.,"

P.O. BOX 38,

EAST MELBOURNE, C.2,

VICTORIA.

CRYSTALS for Lattice Filters and S.S.B. Equipment

FT-241 Crystals in MATCHED PAIRS ± 5 CYCLES are available in following frequencies:

444.444 Kc.	451.852 Kc.	459.259 Kc.	464.815 Kc.
446.296 Kc.	453.704 Kc.	461.111 Kc.	466.607 Kc.
448.148 Kc.	457.407 Kc.	462.963 Kc.	468.519 Kc.
450.000 Kc.			470.370 Kc.

Price per MATCHED PAIR

£3/12/6

Includes sales tax and one dual crystal socket.

455.000 Kc. Crystals, £2/0/0 each, includes sales tax and crystal socket.

HC6/U 100 Kc. Marker Crystals, £4/16/0 each, includes sales tax and crystal socket.

FX-1 Type Crystals, 0.001% accuracy: 1,000 Kc., £5/15/6; 3,500 Kc., £4/6/6

FA-5 Type Crystals, 0.01% accuracy: 1,500 Kc., £4/17/6; 7,000 Kc., £5/8/0
14,000 Kc., £6/8/3; 21,000 Kc., £5/8/0

Prices of Crystals on any frequency upon request.

Prices include sales tax and ceramic socket.

All goods despatched by Certified Mail. Be sure to include your full address and cheque or money order with your order.

PHONE OR MAIL ORDERS ONLY
NO CALLERS PLEASE
XJ 6181, XJ 2353

TRANSTRONIC PRODUCTS
123 BALGOWLAH ROAD, FAIRLIGHT, N.S.W.

RESULTS OF 1962 REMEMBRANCE DAY CONTEST

Our congratulations this year go to Western Australia for retaining the trophy for the second year in succession. Western Australia had the highest percentage participation. Highest State log average this year goes to South Australia. Inspection of the Total State Points column shows that the Contest was very keenly contested, and for the want of a dozen or so more logs from either Queensland or South Australia, any of three States could have won. It is noteworthy that Queensland, who usually run a poor last in this event ran into second place.

All sections of the Contest were keenly contested with some excellent individual scores being registered. Conditions for this year's Contest were not as good as in previous years, and most of the scoring was done on 80 and 40 metres during the period of night operation. Another interesting sidelight is that use was made of the 160 metre band which has not previously been available. Some operators were able

to avail themselves of bonus points by using the 6 metre band.

On the whole, logs returned were of a fairly high standard, although some listeners' logs still persist in claiming points for stations heard and also for stations called.

The task of the F.C.C. could be made somewhat easier by the adoption of a standard Contest Log Sheet. Regarding the issuing of Certificates, the newly formed F.C.C. is awaiting the supply of Certificates from Federal Executive, and when these are to hand this matter will be attended to promptly.

F.C.C. has received suggestions that the Phone Section of the Contest should be divided into s.s.b. and a.m. Further comments from members regarding this matter would be welcomed.

Once again our congratulations to Western Australia for a splendid win and our hope that some new State may win the trophy next year.

—Federal Contest Committee.

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK3AHH	233 902	VK2AKV	20 98
2NR	233 960	2BU	35 08
2ART	230 948	1AB	17 81
2BV	202 910	2ACQ	21 09
2KJ	251 418	2IV	18 88
2ANO	211 388	2OE	20 55
2APP	120 388	2ACD	21 54
2TO	103 323	2RU	15 47
2XT	105 374	2APQ	22 47
2IAP	127 314	1ANR	12 45
2ALV	126 256	2WT	18 48
2ARV	96 256	2XU	11 44
2VP	80 236	2LA	17 45
2BT	99 227	2ST	16 27
2GB	88 224	2ADL	11 35
2HD	82 207	2ATQ	12 38
2ARU	86 187	2AJT	9 59
2RX	83 174	2IJ	15 30
2ARI	58 157	1PM	17 23
2AGF	58 157	1ACA/Log	
2AB	36 116	1NB	11 24
2OD	80 115	2EY	13 28
2EL	58 115	2AAJ	5 21
2ACZ	35 107	1DO	11 21
2AM	41 106	2AIA	11 21
2CW	35 101	2AG	7 26
2AK	32 86	2CS	11 20
2ATX	37 83	2GV	9 14
2RS	36 83	2GHI	9 18
2Z	31 60	2CF	12 18
VK3A/Log		15B	15 18
1KM	41 80	2ACQ/P	6 15
2OH	38 76	2AKL	6 9
2TA	27 75	2AWK	6 9
2ADE	21 75	2AAH	6 8

VK3YX—Check Log.

VK3ACI—Ineligible Log.

DETAILS OF STATE SCORES

	Total State Score	Aver. Top Logs	Licenses	Log Entry	Percentage	State Log Aver.	Total State Points
New South Wales	17,854	782	1,377	104	7.5	171.6	2,130
Victoria	17,478	673	1,342	92	6.8	189.9	1,871
Queensland	14,466	645	449	87	19.3	166.0	3,447
South Australia	16,162	943	520	78	15.0	207.0	3,367
Western Australia	10,646	627	297	87	29.2	122.4	3,746
Tasmania	5,910	540	156	45	28.8	131.3	2,245

VICTORIA

Top Six Logs—

Call	Points
VK3ALZ	813
3AZZ	703
3AK	703
3DF	645
3AIT	633
3RV	600

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK3ALZ	262 813	VK3KX	101 229
3AZZ	258 806	3IC	45 30
3AP	197 446	3KB	37 230
3HG	110 390	3YB	31 29
3KC	126 267	2ABC	21 27
3AST	83 244		

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK3AZZ	252 703	VK3AY	44 91
3ADW	244 646	3IC	45 30
3DF	218 645	3HL	31 88
3AIT	237 632	3NK	40 88
3ARD	132 600	3OX	33 80
3AFU	261 590	3ATU	32 79
3NN	174 528	2ACN	33 68
3AB	184 471	3ATS	23 61
3IS	181 464	3AT	23 61
3ACI	149 394	3AHG	17 52
3ATN	161 383	3AKU	28 50
3LW	120 344	3TF	16 49
3DQ	183 315	3AAT	25 48
3AWT	187 317	2AWP	18 42
3QV	120 307	3ZU	17 38
3AJ	104 287	3AT	21 36
3WR	111 287	3AFP	22 34
3AUL	103 246	3OV/Log	
3AZM	114 243	3UM	7 32
3VZ	98 230	3ACD	12 30
3OM	108 229	3ALD	17 32
3AFJ	113 227	3ABT	15 27
3GWS	108 223	3ACT	13 22
3YQ	78 208	3ALI	11 22
3SW	73 203	3ACS	11 22
3KX	68 180	3ALU	19 22
3SM	89 185	3IE	20 20
3JY	78 148	3AAD	17 20
3ABW	80 144	3RN	11 19
3KX	80 144	3KN	16 19
3AZR	68 140	3PW	11 18
3DY	40 139	3AAD	6 17
3GZ	60 118	3AT	11 17
3HE	37 103	3ZK	8 15
3AFY	45 96	3AWW	8 15

VK3ZL—Check Log.

STATE TROPHY

Western Australia 3,746 points

Highest State Log Average

South Australia 207 points

Highest Individual Score

VK3MS 1,288 points

Award Winners

Open—

VK2AHM—R. J. Whyte	1,218 pts.
3ALZ—I. F. Berwick	813
4DP—D. M. Portley	734
5JN—J. M. Brammer	824
6RU—J. E. Rumble	889
7SM—S. G. Moore	614

Phone—

VK2AHH—N. A. Hanson	902 pts.
3AZZ—R. J. Gray	708
4RH—A. L. Hoey	756
5MS—M. S. Millowick	1,286
6MK—H. T. Mulder	775
7MS—D. M. Siowan	735

C.W.—

VK2APK—D. F. Klesewetter	416 pts.
3RI—R. E. Jones	293
4XW—G. Harmer	315
5MY—H. M. Roberts	400
6SM—M. H. Shaw	289
7LJ—L. R. Jensen	167

Receiving—

L2211—R. C. Abernathy	888 pts.
L3065—I. D. Thomas	860
—C. T. Taylor	959
L5015—W. J. Clayton	833
L6021—P. Drew	815
—G. C. Johnston	748

NEW SOUTH WALES

Top Six Logs—

Call	Points
VK3AHH	1218
3BO	862
3FE	858
3ZB	840
2NB	800
2ART	548

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK3AHH	447 1218	VK3PN	100 255
3BO	296 829	2HC	83 254
3FE	279 820	2ARZ	87 183
3VN	172 826	2AQJ	76 182
2SG	180 614	2CK	80 131
2DO	168 553	2HE	28 118
2BO	152 343	3AUC	36 71
2RA	123 280	2AAB	21 51

C.W.—

Call	Cont. Pt.	Call	Cont. Pt.
VK3APK	121 416	VK3DY	38 85
3QI	148 402	3ME	36 87
2EO	123 352	2ZO	18 81
2NS	80 328	2HC	9 25
2AKB	77 320	2ZC	18 80
2DA	81 212	2AOW	21 36
2YB	99 214	2EG	12 34
2PQ	74 157	2AKK	12 32
1SG	48 119	2BI	11 22
2GW	25 68	2OT	7 11

C.—

Phone—

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK3RJ	123 263	VK3KS	25 88
2AKN	84 262	3AND	48 84
3IE	120 202	3B	48 85
32A	97 209	3DG	11 14
3ARX	64 180	3FU	6 10
3JI	52 138	3FO	7 8

Call	Cont. Pt.	Call	Cont. Pt.
VK3MS	487 1286	VK3WN	27 102
3UK	583 132	3ZZ	67 91
3KK	432 1187	3CH	31 91
3FT	263 377	3LB	31 91
3UA	383 677	3LC	35 70
3UJ	373 976	3BD	37 97
3JR	189 528	3CJ	35 56
3KX	117 354	3WV	20 53
3DZ	133 542	3D	31 51
3KP	123 256	3UA/Log	
3TM	116 330	3UZ	18 44

Call	Cont. Pt.	Call	Cont. Pt.
VK7SM	212 814	VK7JO	20 43
3ZZ	123 381	7W	10 13
7KS	100 248	7W/Log	
7DS	44 72	7AL	6 16
7YL	15 47		

QUEENSLAND

Top Six Logs—

VK4RH	788 points
4DF	754
4TJ	754
4QJ	842
4OR	838
4LT	834

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK4DP	287 124	VK4BN	22 75
4ZB	87 323	4CN	14 53
4EO	108 240	4QW	25 43
4JR	81 84	4GH	13 18

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK4RH	288 136	VK4LW	44 106
4UX	283 704	4LB	43 91
4QJ	249 608	4NG	34 82
4ZB	213 530	4FY	43 50
4OR	203 534	4RE	34 75
4TM	187 488	4AF	34 74
4PS	120 413	4NP	15 88
4BQ	132 385	4FM	27 10
4CP	130 371	4ZAZ	14 87
4VJ	143 352	4VJ	20 65
4NB	128 349	4CZ	31 65
4EJ	102 346	4FP	27 57
4HC	71 306	4LE	34 53
4LJ	116 294	4ZWB	9 53
4EE	78 278	4XA	12 45
4VW	77 250	4RX	18 35
4EJ	103 239	4LA	30 35
4ZR	90 231	4GT	10 30
4NF	84 117	4B	18 30
4WS	78 297	4GQ	21 28
4VH	56 187	4ZM	6 27
4FY	87 171	4AQ	14 24
4UW	60 159	4CJ	7 23
4WO	48 154	4P	5 22
4ZZ	73 158	4W	10 20
4EJ	58 148	4R	8 19
4CB	57 144	4RW	6 17
4BL	46 138	4OL	16 17
4RO	47 123	4WD	5 8
4XC	49 120	4GS	6 8
4OV	50 110	4LN	7 7
4SL	28 102	4FM	8 6

C.—

Call	Cont. Pt.	Call	Cont. Pt.
VK4XV	121 818	VK4SS	18 59
4VR	97 232	4JS	13 49
4CJ	114 348	4SD	19 46
4DT	86 280	4PT	16 17
4CK	78 187	4WY	9 37
4HR	50 141	4AW	8 10
4XP	51 130		

SOUTH AUSTRALIA

Top Six Logs—

VK5MS	1220 points
5ZK	1188
5KK	1187
5PT	787
5UA	977
5JN	934

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK5JN	286 624	VK5ZC	87 153
5TC	218 550	5UX	89 117
5CV	111 378	5AG	23 79
5BU	131 367	5KI	32 87
5QR	138 317	5RK	13 54
5WO	86 239	5EM	18 47

C.—

Call	Cont. Pt.	Call	Cont. Pt.
VK5MY	151 480	VK5LJ	81 107
5XK	124 363	5OR	41 81
5LD	124 323	5TL	29 80
5JT	82 300	5RX	12 48
5ZV	84 290	5CU	14 48
5FY	80 184	5FM	5 7

WESTERN AUSTRALIA

Top Six Logs—

VK6RU	888 points
6MK	775
6KW	775
6XR	431
6PH	431
6RY	413

Open—

Call	Cont. Pt.	Call	Cont. Pt.
VK6RU	396 689	VK6JK	30 43
6PH	192 681	6EZ	18 41
6RE	182 684	6VX	13 28
6SK	21 49		

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK6MK	391 775	VK6RW	40 80
6WK	382 717	6RG	29 75
6KX	369 333	6TR	30 78
6RY	172 413	6DC	31 71
6AR	152 394	6AB	27 64
6XO	189 382	6A	28 64
6RX	142 311	6TR	24 60
6NF	106 240	6EM	23 49
6RE	103 231	6GD	30 48
6C	98 223	6C	32 48
6GL	86 220	6DI	32 48
6JO	78 175	6SI	17 41
6TH	68 173	6CH	16 37
6LR	71 188	6AW	13 28
6CN	64 143	6OR	14 28
6RH	57 127	6MR	11 24
6XO	50 125	6RH	10 23
6JS	55 131	6LM	11 21
6CR	56 128	6OB	9 23
6KX	56 122	6CO	8 23
6VL	57 122	6MB	7 19
6YV	43 121	6MO	7 19
6DX	46 114	6OG	7 18
6CA	45 102	6TT	9 18
6CL	43 101	6LS	6 16
6BU	42 98	6LK	7 16
6OS	40 96	6TC	6 15
6CJ	43 96	6KB	11 15
6KJ	35 94	6WL	6 13
6CP	35 93	6VF	9 13
6LF	33 83		

C.—

Call	Cont. Pt.	Call	Cont. Pt.
VK6JA	123 328	VK6JA	9 21
6AS	88 141	6WT/Log	
6KX	83 133	6D	7 20
6ZO	48 103	6GP	6 18
6WT	32 78	6UP	7 17
6VR	30 75	6CJ	14 16
6TS/P	15 45	6MY	7 13
6BA	31 45	6AJ	7 11
6WG	10 24	6GM	7 10
6AS/Log		6SK	6 9
6GA	7 23		

TASMANIA

Top Six Logs—

VK7MS	1235 points
7AI	690
7SM	614
7P	448
7KH	331

Phone—

Call	Cont. Pt.	Call	Cont. Pt.
VK7MS	275 735	VK7JO	24 35
7AI	225 690	7CA	14 32
7JP	189 469	7EB	17 32
7BK	188 426	7AB	17 32
7KR	114 229	7DR/Log	
7IL	113 221	7DR	10 19
7CT	79 144	7JD	9 18
7PJ	27 87	7AX	7 17
7BQ	26 82	7BT	4 14
7DK	25 82	7DK	6 14
7PJ	20 86	7DA	6 12
7FH	15 35	7RM	6 12
7MY	16 35	7CF	7 8

C.—

Call	Cont. Pt.	Call	Cont. Pt.
VK7LJ	65 187	VK7CH	30 38
7KA	58 130	7BJ	30 38
7RY	43 82	7EC	17 45
7AG	69 89	7KS	18 43
7MZ	30 68	7WA	7 14

VK7LJ—Disqualified Log.

PAPUA NEW GUINEA AND TERRITORIES

Call	Cont. Pt.	Call	Cont. Pt.
VK8DJ	188 388	VK8LA	30 87

ANTARCTICA

Call	Cont. Pt.	Call	Cont. Pt.
VK8JM	10 80	VK8DW	9 54

RECEIVING SECTION

WIA-12311-R. C. Abernathy	888 points
L2033-D. Shephard	636
L2033-H. B. John	420
L2033-L. Miller	218
L2033-M. Miller	218
L2033-N. McPherson	227
L2033-P. Brown	225
L2033-P. Brown	225
L2033-S. Smyth	180
L2033-L. O'Shea	184
L2033-R. Erwin	185
L2033-A. Mullen	61
L2033-K. Rowe	31

Victoria—

WIA-12045-I. D. Thomas	988 points
L2078-G. Young	608
L2078-S. Gething	447
L2074-J. M. Hillard	421
L2022-VK3-D. M. Grantley	414
L2011-K. Reynolds	333
L2011-N. C. Harrison	333
L2043-E. W. Trebblecock	323
L2108-J. Kennedy	381
L2088-H. Woodman	178
L2089-J. Johnson	178
G. Hunt	174
L2063-C. Cook	45

Queensland—

C. T. Taylor	928 points
WIA-14021-H. N. Thompson	406
T. A. Lane	453
W. F. Summers	388
G. F. Hannan	447
G. W. Fox	62
G. Milner	64
L4010-G. V. Frankes	43

South Australia—

WIA-15015-W. J. Clayton	833 points
L5041-D. J. Coggins	505
J. Lodge	505
C. R. Walker	454
J. Whitfield	343
Miss O. J. Martin	25

Western Australia—

WIA-15003-P. Price	815 points
R. Wilkinson	414
T. Cole	252

Tasmania—

G. C. Johnston	748 points
WIA-17023-J. Gibson	185
L7015-W. Nikola	147
G. Rand	138
L7025-J. Keen	119
A. Smith	56

TECHNICAL TOPICS

(Continued from Page 12)

ately at a sharp ridge. That this technique has now been recognised and adopted by our commercial colleagues is made clear in "Electronics" (April 6, 1962). An article describes how 1855 Mc. signals from a 15 watt transmitter with a 10 ft. dish (parabolic) aerial sent signals over a 454 miles path across a range of mountains by aiming the aerial at an intervening ridge (3,789 ft. high), the signals being diffracted down the other side. It is forecast that ranges of 1,000 miles could be achieved using this type of scatter.

While on the subject of parabolic dish aerials, already being used by Amateurs for moon-bounce and radio astronomy, it is worth noting that the

Russians are reported to have constructed 20 metre dishes for cloud observation radar using reinforced concrete plated with zinc at a cost "some hundreds of times less than for a conventional metal structure." Better scout round the nearest building site for a spare concrete mixer.

FOLLOW-UPS

Another application of Nuvistors is highlighted in R.C.A. "Ham Tips" (Spring 1962). This is for low power miniaturised v.h.f. transmitters for mobile or fixed-station use. The high anode dissipation rating for their small size, their suitability for use up to 400 Mc., their rugged construction are all points in their favour. The article, by W2OKO, gives constructional details of a 144 Mc. transmitter with a pair of

7587 Nuvistor tetrodes in the p.a. for inputs up to 7½ watts, and two 7588 triodes in the earlier stages. The whole r.f. section sits comfortably on a 5" x 7" piece of copper or brass. In the May "QST" W1YDS describes a simple and compact 420 Mc. super-regen. transceiver using a 6CW4 Nuvistor plus two a.f. transistors.

We have several times commented on the controversy still raging in professional as well as Amateur circles on the relative merits and demerits of the various a.m. and sideband modes. Latest shot is the argument that suppressed carrier has severe limitations for use in high speed aircraft because of Doppler shift (even a 20 c/s. error can upset data links and selective calling systems). So watch your speed on s.s.b. mobile!



SOLDERING INSTRUMENTS

This range of precision made soldering tools and equipment, widely used overseas, has been designed and developed to facilitate the fastest and most efficient soldering of standard and miniaturised radio and electronic equipment.

Approved Mains Voltage Tools:

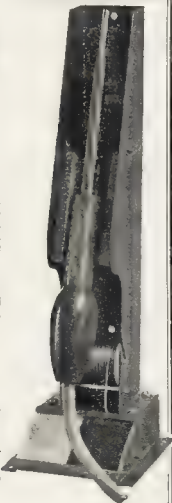
- No Transformer required. Supplied for all voltage ranges from 6/TV. to 230/250V.
- Models for all Applications.
- Constant Temperature performance.
- Light weight, perfect balance.
- Rapid Heating.
- Long life, simple maintenance.
- Low Loading, and cheap to operate.
- Designed for Safety.
- Quality Guaranteed.

Further information from Manufacturers:—

ADCOLA PRODUCTS
PTY. LTD.

673 WHITEHORSE ROAD, MONT ALBERT, VIC.

Telephone 88-4351. And all principle radio parts supply houses.



LOW DRIFT CRYSTALS

FOR
AMATEUR BANDS

ACCURACY 0.02% OF
STATED FREQUENCY

3.5 and 7 Mc.

Unmounted, £2/10/0

Mounted, £3/0/0

12.5 and 14 Mc.
Fundamental Crystals,
"Low Drift,"

Mounted only, £5.

THESE PRICES DO NOT
INCLUDE SALES TAX.

Spot Frequency Crystals
Prices on Application.

Regrinds £1/10/0

MAXWELL HOWDEN

15 CLAREMONT CRES.,
CANTERBURY, E.7,
VICTORIA

VICTORIA

The annual election meeting of the VK3 S.W. Group took place in Sept. with 17 members in attendance. The general meeting moved along rather early and when closed was time to elect office bearers for the following twelve months, recognised as follows: President, Bob Young; Vice-President, Noel Harrison, 1st Secretary, Assistant Secretary, Craig Cook, Publicity Officer, Mac Hillard, S.W.I. Notes Sub-Editor, Bob Young.

Maurie L3035 has recently returned from VK7 with his rather long holiday. It seems I was misinformed when it was stated in a past issue of "A.R." that he was moving over there for good. Goes to show you can't believe everything you hear. However, after getting everything in order at his QTH, the dust was blown out of the H.R.O. and when connected to the antenna it came to life, after wiring up a filter network for the product detector Maurice was in business again on the DX bands.

Yours truly is still playing around with 1 mhz receiving, that is, heard a VK1R1 at 1.8 and 9, but unfortunately he was stationary mobile on Mt. Dandenong—some DX.

RADIO MAIL

I wish to thank the following for their mail: Chas Abernethy, Colin Walker, Eric Trebilcock, Ross Erwin, Don Granley, David Thomas, Tom Kennedy, and last, but not least, Lew Sharpley, a new member from VK4.

Chas L3211 has not been very active of late due to his son using the shack, and now that Chas is back in the shack the DX is now being caught up. At present Chas is preparing for the 50 Mc season, and hopes to have the gear ready for the openings which he hopes are plentiful. A few improvements have been made to simplify operations on the 144 and 50 Mc bands.

Colin L3046 has not been doing a great deal of listening this month due to the fact that he is studying for the A.O.C.P. which he hopes to sit for in Oct. or January. Needless to say, the DX is not too hot, however, a few new Zones have been recorded during the month—they are Finland, Germany, France, Mexico, P.I. Island, Canada and Hong Kong.

Eric L3042 to date (8/18/52) has mailed 1264 reports and has received QSLs from 100 countries, 35 more also during 1952. 126 countries and 38 zones have been heard. Eric is hoping that five or more members of the VK3 Group that sit in entries for the VK3-2 Contest as his offer for prizes still stands. Also another offer from Eric. He has a chance to take three other VK3's out on a week-end visit to a well known world DX Amateur located on a farm near a country town 150 miles from Melbourne. Visit will be in early 1953. It involved contact Eric for further particulars.

Lew L4030 dropped me a few lines of his activities on the S.W. front. The rx he is using is a Zenith, feed with a 20 mc Kirtz antenna running S. and W. While recently looking through the S.W.I. notes, Lew thought he would like to be included in them and wants to send more information of his activities. By all means do so, OM! Lew is a new member of the W.I.A. VK4 Division, which has recently got under way and I am wondering if there are any interested listeners that would like to see their name in print?

Ross L2333/P in VK3 at the School of Sig. Mails, Rohnsburg on 3rd Oct. was using a station called Honolulu Radio. The freq was approx 836 Mc, the broadcast was in English and the station was giving data on the weather and time. Ross heard times heard 2020 to 2025 and 2035 to 2040 E.A.S.T. Any available information concerning this station would be greatly appreciated. Ross is using a National T367 rx with a long wire antenna, 15 ft. high facing S.W. and N.E.

Don L3035 has been doing things fairly quiet at his QTH, but managed to cross into VK3 for a few hours during the R.D. Contest and received a total of 414 points. Don also entered the contest and hopes to receive a good score. Conditions up there are really good and with the gear working 100 per cent. Don is planning to operate, DX totals will be coming up the ladder.

David L2335, while reading Sept. s.w.I. notes, thought a letter from VK3 would go astray (not by a long shot, David, the more the

merrier). Unfortunately listening has been placed in the background due to studies for the Intermediate being more important, but a chance arises in listening on the 40 mhz. The equipment being used at the moment is a four-tube d.w. rx, which is the only one working right now, a six-tube English com. rx and a 13-tube QSR under construction. The antennae are a 20 mc Windom and a five element 3 m beam. As yet there is no proper radio shack, but when a spare room is available, operating will take place from there. David has held a s.w.I. number for about nine months and has heard three countries (unconfirmed). Quite a few QSL cards have been sent out, but as yet received no returns.

Tom L3113 has received via this column and Hamads offers of help and assistance for his ARB rx which is at present inoperative, including the offer of the original manual for the rx as a gift and thanks all concerned. Tom has put forward a suggestion to use the following information on QSL cards. The Royal Australian Navy will supply the precise location of the nearest railway station to a QTH, or area of operations, and this may be useful to those boys and girls who are interested in bearings for co-ordination purposes. Mr. A. Egipstein, the co-ordinator, Naval Public Relations Dept., 1011 Canberra, is the gentleman concerned. The Navy cannot supply the exact reference to a house number, but the information supplied should be useful for most purposes of calculation. What do you think

of this suggestion that members indicate their location in latitude and longitude on QSL cards and reports?

P. S. Gregory, L2663, who did not leave a christian name, may be leaving the ranks of s.w.I. and may join the Z calls on 8 mhz by the sound of things. He has recently completed the construction of a 4 element yagi and a three-tube converter for 6 mhz. The rx being used on the lower bands is a Marconi R35, the antenna system is a 10 and 30 mc dipole, 35 ft high, also a 15 mhz and 40 mc doublet (also suitable for 30 mhz), and a long wire is being used for 80 and 160 mhz.

Wishing all Short Wave listeners and Amateurs all the best for Xmas and the New Year, and hope those long-awaited QSL cards come to Ye in Feb. 73, Robert, L3076.

EX-LIBRES TO OUR READERS

	Countries	Zns.	S.W.	W
Conf.	Hrd.	Conf.	Hrd.	Conf.
E. Trebilcock	277	268	43	—
D. Granley	111	200	38	16
A. Wescott	84	158	31	9
M. Hillard	89	211	33	9
D. Cox	44	208	27	—
C. Abernethy	44	88	27	—
N. Harrison	38	88	27	—
P. Brown	38	134	18	88
I. Thomas	38	134	18	88
P. Fields	36	128	—	—
D. Jenkins	10	141	7	—
R. Burger	6	185	8	1

YOUTH RADIO CLUBS

Did you know that we now have the official approval of the N.S.W. Dept. of Education? That we have a record of the Boy Scouts movement? That both the executive and engineers of the commercial broadcasting stations are very interested indeed? That the Air Training Corps are interested in our stations and their classes do our certificates for higher all-round efficiency? That we are going to have more and better publicity for the real benefits of Amateur Radio than any other activity you can think of?

You don't have to force yourself to do something for a Youth Radio Club if you have experienced, just once, the expression on the face of a boy who has just heard the faint signal come through his little set, he built himself in the month in the year of youth of 16 or 17 who shows you the letter telling him he has passed A.O.C.P. You're on a certainty—anything you do for this movement MUST be for the good.

Harking back to the commercial broadcasting people, I must tell you that this is absolute fact. Here in Canberra, the manager of KCR telephoned me to ask if I had a boy in the Lynnham High School Radio Club who would like a job. He reasoned, with good sense, that KCR would be getting a fresh batch of trainees who would (a) have much basic knowledge, (b) have proved his aptitude for further study, (c) have proved his attitude and his work ethic for good. One of our boys now has his job waiting for him after his Leaving Certificate examination. There was a further idea of an address to the Federation of Commercial Broadcasters on the Youth Radio Club scheme but it was not possible this year as the programme was already arranged. The chief engineer of the local t.v. stations is also interested in the possibility of training technicians. Understand all broadcasting and t.v. stations are short of technicians and trainees of quality. You Club Leaders—go sell 'em!

Without too much of a blow on the trumpet, can anyone beat this under present regulations? One of our boys, George, first worked passed fully in A.O.C.P. at the age of 16 years 1 month, and is now VK16B. We're proud of George's feat, but we'll gladly mantle any better.

The N.S.W. Dept. of Education has officially approved Youth Radio Clubs in High Schools and it is expected that this will not only give the green light to Science Masters but will also

lead to Summer Schools to train science teachers in basic radio and methods of running a radio club. Surely each W.I.A. Division can get this far!

As your semi-annual scribe, I appeal to you all to give me information on club activities. Let me know about your members and your gear for lack of it. Particularly let me know how you are getting on with the Scout movement—such as, for instance, boys who get a job through your club, all forms of public service and display, progress with State Departments of Education, etc. No letter is too trivial, and I hope to hear from all States. Can you write me a brief summary of your activities from the very beginning? I want to card-index you all and prepare a very thick file to re-inforce our next I.T.U. case. This is a situation where we must not only do good but also blow off about it.

A parting thought—when you write, can you tell me that your local parliamentary member is a patron of your club? Surely you can manage at least the mayor, if not both.

73, Ken VK1KRM

THE NEW "A.R."

LOG BOOK

IS NOW AVAILABLE

Larger, spiral-bound pages
with more writing space.

Price 5'6 each
plus Postage

Obtainable from your Divisional
Secretary, or W.I.A. P.O. Box 35,
East Melbourne, C2, Victoria.

ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

W.I.C.E.N. EXERCISE BY S.A. DIVISION

At the first meeting of the S.A. W.I.C.E.N. Activities Committee, it was decided to hold two on-the-air exercises in the coming two months. Before describing these two exercises in detail, it should be mentioned that the Committee decided:—

- (1) To recommend to all South Australian W.I.C.E.N. members to buy Army Ordnance Survey Maps of Gawler, Adelaide and Echunga. These may be bought from Sands & McDougall, King William St., Adelaide. Members having to have the maps of Gawler and Adelaide.
- (2) That all exercises in the immediate future will take place on either of both 3.538 Mc. and 5.31 Mc. telephony. It therefore recommends that mobile W.I.C.E.N. equipment be crystal controlled on these frequencies.

The first exercise was held on 28th Nov. on 3.538 Mc. and 5.31 Mc. It was a general get-together of W.I.C.E.N. members and those interested in W.I.C.E.N.

The second exercise will be held on the afternoon of Sunday, 2nd Dec., starting at 1330 hrs. As well as giving practice in emergency communications and map reading, it should be a pleasant afternoon's drive in the country. Although primarily intended for mobile transmitting stations, members with fixed stations only or mobile receivers may, and indeed, are very welcome to participate. The exercise will be of a competitive nature and the winner will be given a 14 Mc. crystal.

The exercise will take place in four stages. Should a member find it is impossible or inconvenient to take part in any stage, he is quite at liberty to miss that stage and join in at the next control point. We want members to gain practice in emergency procedure—the points system adds interest but is not so important.

The rules to be described apply to mobile transmitting stations. Modifications for members with fixed stations only or mobile receivers will be given after a member scores points as follows:—

- (a) For missing a check point in the time allowed ... 25 points.
- (b) For every mile travelled in excess of the minimum distance between check points ... 5 points.
- (c) For every incorrect phonetic used, 1 pt.
- (d) For every omission of the word "figures" before any number group except 1 point.
- (e) For every omission of the name of the map in use, for every omission of the words "map reference" before giving the six figures of a map reference, e.g. "Gawler may reference 123331" is correct, but "map reference 123331" or "Gawler 123331" would lose you one point.

The N.A.T.O. phonetic alphabet will be used. This is the Australian emergency communications phonetic alphabet.

If a member wants to omit one stage but still stay in the contest side of the exercise, he should have his speedometer working, or by one of the control station operators at the previous check point.

The winner will be the station with the smallest score, and will be announced on the WSWV broadcast of Dec. 9.

RULES FOR MOBILE TX STATIONS

In each of the four stages there will be a control station on 3.538 Mc. and 5.31 Mc. Upon request they will give the mobile a map reference to which they must go within the time allotted.

Stage 1: Starts 1330 hours. Control stations: VK5RC and VK5CQ. Both within five miles of G.P.O. At 1400 hours both operators will close down their fixed stations and operate as control stations until 1415 hours, when stage 1 ends.

Stage 2: Starts 1415 hours. Control stations: VK5TM/M and VK5ZM/M. The map reference they will give upon request will be their own. They will be located somewhere between Elizabeth and Gepps Cross. Stage 2 ends at 1515 hours.

Stage 3: Starts 1515 hours. Control stations on both channels, VK5PE. The map reference will be that of VK5QL, mobile on 5.31 Mc.

somewhere between Elizabeth and Smithfield. Mobiles on 3.538 Mc. may communicate with VK5QL/M by being relayed on 5.31 Mc. by VK5PE. Stage 3 ends 1600 hours.

Stage 4: Starts 1600 hours. Control stations: VK5NQ and VK5MR/M. The map reference will be that of VK5ZM/M, somewhere near Gawler. Stage 4, and the exercise, will end at 1700 hours.

Mobile Receiving Stations will have to wait until the map reference is given to a mobile transmitting station.

Members without Mobile Equipment will have to receive the map reference by word of mouth from mobile stations at the check point.

Six metre mobile stations without a crystal for 5.31 Mc. note that the Elizabeth Amateur Radio Club and its members have a limited amount of 5.900 Mc. crystals (3.9 x 8 x 3 equals \$3.1) to lend for this exercise and will later have more such crystals for sale at a nominal price.

—S.A. W.I.C.E.N. Activities Committee.

DURALUMIN, ALUMINIUM ALLOY TUBING

IDEAL FOR BEAM AERIALS AND T.V.

★ LIGHT ★ STRONG ★ NON-CORROSIVE

STOCKS NOW AVAILABLE FOR IMMEDIATE DELIVERY

ALL DIAMETERS— $\frac{1}{4}$ " TO 3"

Price List on Request

STOCKISTS OF SHEETS—ALL SIZES AND GAUGES

GUNNERSSEN ALLEN METALS PTY. LTD.

SALMON STREET,
PORT MELBOURNE, VIC.

Phone: 64-3351 (10 lines)
Telegrams: "Metals," Melb.



HANSON ROAD,
WINGFIELD, S.A.

Phone: 45-8021 (4 lines)
Telegrams: "Metals," Adel.

BRIGHT STAR CRYSTALS

FOR ACCURACY, STABILITY, ACTIVITY
AND OUTPUT



Our Crystals cover all types and frequencies in common use and include overtone, plated and vacuum mounted. Holders include the following: DC11, FT243, HC-6U, CRA, BTG, Octal, HC-18U.

THE FOLLOWING FISHING-BOAT FREQUENCIES ARE AVAILABLE IN FT243 HOLDERS:—

6280, 4095, 4535, 2760, 2524 Kc.

1.500 Kc. T.V. Sweep Generator Crystals, 23/12/6.

100 Kc. and 1000 Kc. Frequency Standard, 23/10/6 plus 12½% Sales Tax.

Immediate delivery on all above types.

AUDIO AND ULTRASONIC CRYSTALS—Prices on application.

455 Kc. Filter Crystals, vacuum mounted, 23/10/6 each plus 12½% Sales Tax.

ALSO AMATEUR TYPE CRYSTALS—3.5 AND 7 Mc. BAND.

Commercial—9.82% 23/12/6, 0.01% 23/15/6, plus 12½% Sales Tax.

Amateur—from 23 each, plus 12½% Sales Tax.

Regrinds 21/10/-.

CRYSTALS FOR TAXI AND BUSH FIRE SETS ALSO AVAILABLE.

We would be happy to advise and quote you.

New Zealand Representatives: Messrs. Carrel & Carrel, Box 2102, Auckland.

Contractors to Federal and State Government Departments.

BRIGHT STAR RADIO

46 Eastgate Street, Oakleigh, S.E.12, Vic.

Phone: 57-6387

With the co-operation of our overseas associates our crystal manufacturing methods are the latest.



FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

NEW SOUTH WALES

The Dec. meeting of the N.S.W. Division will be held at Wireless Institute Centre, 34 Acheson St., Crowns Nest, on Friday, 14th. The members will be in the form of a social evening to which members may invite their XYLs, YLs, etc., and the entertainment has been specially arranged to cater for all. A talk will be given by Mr. Gordon Sanders, of the Dept. of Civil Aviation, entitled "A Field Day with a Difference." This talk, illustrated by slides, is something different from the usual run of Ham Field Days.

In addition, there will be two films of a non technical nature on Amateur Radio. One of these films has been shown on ABC television. Members are asked to bring their XYLs, YLs, etc., and make this evening a social success.

Since the last notice in "A.R." eight lecture tapes have been compiled by the Education Officer, Harold 2AAH. These are as follows —

- 1—Quad Antennas, by Harold 2AAH, Sid 2SG and Ted 2ACD. This interesting tape runs for 46 minutes and is illustrated by 32 slides.
- 2—Linear Amplifiers. A tape by Mr. Bob Wilson, which runs for 60 minutes and is illustrated by seven slides.
- 3—Transistorized Converters. A tape by Syd 2SG, which runs for 90 minutes and is illustrated by 13 slides.
- 4—Tally-He. An excellent tape on Y Mc. Fox Hunts, which runs for 60 minutes. The talk is by Harold 2AAH and is illustrated by five slides.
- 5—Grid Dip Oscillators, by Bob 3OA. This tape runs for 80 minutes and is illustrated by 15 slides.
- 6—Radio Transformers. This very interesting tape by Joe 3JR, runs for two hours and is illustrated by 33 slides.
- 7—How and Where does my signal go? A tape by Jim 3JH, who does some of the signal work, and Frank 3GL, illustrated by 17 slides.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cor. Cnt.	Cor. Cnt.	Call	Cor. Cnt.	Cor. Cnt.
VK3IAB	45	279	VK3KXW	4	302
VK3RPU	8	272	VK3JATN	26	204
VK3MKK	43	263	VK3AHR	18	193
VK3AHO	11	256	VK3ARW	23	144
VK3AFY	21	256	VK3RZ	50	113
VK3JWL	14	211	VK3WQ	56	178

Amendment: New Members:
VK3AGB 54 103 VK3JA 80 102

C.W.

Call	Cor. Cnt.	Call	Cor. Cnt.	Call	Cor. Cnt.
VK3RIB	10	305	VK3VJP	56	229
VK3IAB	45	279	VK3RZ	50	113
VK3QGL	10	305	VK3RZB	15	222
VK3AFY	21	256	VK3AHR	18	193
VK3JNC	19	261	VK3AGH	11	216
VK3RPU	18	254	VK3JWL	14	211

Amendment: 73 134
VK3JY 27 206 VK3JAM 73 134

OPEN

Call	Cor. Cnt.	Call	Cor. Cnt.	Call	Cor. Cnt.
VK3JACK	8	305	VK3AHO	76	256
VK3RPU	8	283	VK3JHQ	3	253
VK3AFY	21	256	VK3AHR	18	193
VK3JNC	19	261	VK3RZB	15	222
VK3AGH	11	216	VK3JA	43	229
VK3JWL	14	211	VK3JWL	45	225

Amendment: New Members:
VK3AM 84 152 VK3AN 88 100

These tapes and slides are available to members, clubs, etc., and have been specially prepared for use by county clubs, so contact Harold 2AAH for particulars.

The Council wishes to thank the following members who have donated gear to the Youth Radio Scheme: VK3 HJ, 3CA, 3ET, and Arthur Sutton. How about going through the junk box and making up a parcel of the gear you do not need and forward it to the Wireless Institute Centre for the various schools that are training boys in the art of radio?

The Annual Convention of the N.S.W. Division will be held during the Anniversary week-end in January. The Annual Dinner will be held at Wireless Institute Centre on Saturday night at 8.15 and the Field Day will be held at VK3WI transmitting centre at Dural on Sunday. A Convention Committee has been formed and are holding regular meetings to arrange for the success of the Convention, so it should be a success. 73, 3VL.

HUNTER BRANCH

The most recent meeting of the Hunter Branch of this Institute was held at the Newcastle University College on Friday, 13th Oct. Three members and guests were present to hear a most interesting lecture from our renowned associate of Mr. Marconi in the person of Mr. Joe Reed, who had undertaken the trip from Sydney earlier in the day, used a magic lantern to show some very enlightening line drawings and woodcuts depicting the state of the art. As well as the excellent pictures, the interested gathering was treated to a demonstration of Mr. Reed's famed talking machine, a compact instrument, no larger than a pocket calculator, which receives and transmits. So great was the interest shown in Mr. Reed's discourse that several of the more ambitious of our gathering remained after the others had left the room to try the lecture with questions. Mr. Reed patiently answered each in turn and our correspondent at the gathering, who was one of the speakers, was enough to stay after the lecture, reported that Mr. Reed filled several large sheets of writing paper with further line drawings, used, no doubt, to illustrate points not completely covered in the talk.

Those contemplating using any of Mr. Reed's ideas in their own residences are advised that he has gone to considerable lengths to make available, for a most modest fee, superbly engraved prints, about the size of a post card, of all of the illustrations used during the evening. keen students would do well to take advantage of this offer and will no doubt contact Mr. Reed at his home to make the necessary arrangements.

However, for those more interested in the happenings of our immediate neighbourhood, here, in detail, is the news of the month crunched in slightly more modern terminology. The three L.V. stars of the Branch are still recovering from their escapades of the week-end of the Scout Jamboree on the Air During the week-end the 2AHS, Vic 2KBP, 3ZKX, 3ZKW, Gordon 2ZSG and the Hamburgers 2A2T made stations available to the Scouts of this area. Lots of interesting fun was had by all and the local station NBS was also the boys and the W.I.A. some very good coverage in news and presentation telecasts. Thank you Gordon and thank you also to the boys who did a good job in promoting the cause of Amateur Radio.

By the time you read this, Lionel RCS will have returned from his sojourn in the Amazon residence of Ray 2HC. It is hoped also that he will be at Ray enough to return to his place of employment at the hot water board. The reason for the appearance of the boys of late is the magic call of the silver screen with Key emulating the pious example of Cecil B. DeMille and getting some films ready for Christmas. When he comes to the 2 x 2 band you will no doubt wish to hear him and so I contact Mac 2ZMB who has at least a dozen more converts for disposal (if any told). Bill 2XT at this time is still on his Oriental orientations but should be back in time for our December meeting—and more of this later.

It is also reported that Varley 2SF has been seen walking along Hunter Street of late with a large plastic bucket, muttering something

about Sturt and euds. Perhaps those in the know will enlighten me. Sturt in the mean time is running up some good scores in the 36 meg. band with regular contacts to VK6 4 and 5 using his simple "elementary dipole" which has been dubbed "Not so fortunate is the plight of Neil 2ZCU who was involved in a car smash recently and is now an inmate of Hornsby District Hospital. Best wishes Neil and hope that some of the Sydney boys will be able to visit you. Ian 2ZIF has just completed a 2 mhz transceiver in a lunch box. This is used to fool the fellow employees I am informed. Norm 2ZNF is still twiddling knobs on the AMR300 and up Raymond Terrace way there is a shortage of exercise books because Tom Davis has used them all as log books on the new rx.

Romen and Juliet, 2RJ to you, are holidaying in VK3, while John 2ZGJ is holidaying in Newcastle, doing tech. exams with ZIF. On the h.f. bands, Vic 2AKP has been bitten by the bug again and is regularly on again, while Rodney 2CN, sewing enough of v.h.f. at work is now running 120w, on 7 meg. Neil 2XY has been off work for some time with an injured hand and we all wish him speedy recovery. Ron 2ZGJ will conduct a regular on the A.B.C. Hospital Half Hour the other day by courtesy of the Talkative Tough from Turramurra, and Ron also is looking forward to continued activity on a mhz. 3ZL is looking for some ready made moulds for casting concrete sleepers while his other (no pun intended, Bob 2AGK, still conducts a regular talk on 80 Gordon 2ZSG has been heard at Ikvald, via radio, and Harry 2AFA has not been heard at all. Four new associates have joined our ranks and more about this next month.

The Dec. meeting, set down for Friday, 14th, is the 15th for the N.S.W. Division. From Japan and all point East, while Bill 2ZL has promised, as is customary, to shout all to a grand Christmas supper afterwards, all are expected to arrive at the Divisional festive season from the scribe and all the boys and try to make it on the 14th to meet all your long lost friends and others will be there so see you, 73, 2AKK.

BLUE MOUNTAINS SECTION

The Oct. meeting held at Lawson was disappointing again as we were still away and could not give us his lecture, although I understand there was a mix-up with yours truly. Fifteen members attended and the final arrangements were made for the field day and turned out an excellent day.

It was held at Lawson Swimming Pool with record attendance of 56, including a DL3OF. Dave 2NKP, VU Section President, welcomed all and asked Mac 2MP, the Div. President, to present the prizes, the results which were as follows: Mac 2BIB, 1st; 2ZGJ, 2nd; Tim 2ZTM 144 Mc. scramble: 1st and 2nd the usual 21 contacts, Dick 2ZCF and Dave 2A2W 7 Mc. scramble, 1st, Harold 2AAH (13); 2nd, John 2WJ (18). Gent. lucky number, 1st, 2ZTM; 2nd, 2ADA. Ladies' lucky number, 1st, 2ASZ; 2nd, 2ADA; 3rd, 2ZCF. Bob 2ASZ was the fox and hid the tx in a record

W.I.A., N.S.W. DIVISION

ANNUAL CONVENTION ANNIVERSARY WEEK-END

THE ANNUAL DINNER will be held at 14 Acheson St., Crowns Nest, on Sat. at 8 p.m. Sub. 25/-.

THE FIELD DAY will be held at Dural on Sunday. Sub. 10/-.

Come along and make this Convention a success. A good programme of events has been arranged.

Subscriptions and Bookings to Bill Shakespeare, VK2AGF.

TELECOMPONENTS REPLACEMENT PARTS ARE DESIGNED FOR . . .



THE TELEVISION SERVICING INDUSTRY

TELECOMPONENTS introduce a potted anti-corona ring for line output transformers

This newly developed technique has enabled Telecomponents to produce replacement tertiary windings which can be used in the proximity of metal parts without flash over and subsequent breakdowns, thus eliminating costly modification to the line output circuits of the original receiver.

SPECIAL RELEASE OF AMATEUR BAND QUAD ANTENNA KIT

Kit of Channel Master component parts for Amateur Band Quad Antenna, comprising aluminium tubing, cut and swaged, all hardware, telescopic masting automatic rotator.



SPECIAL PACKAGE DEAL . . .

Write for full particulars or Phone XF 0221 Sydney

ASK FOR TELECOMPONENTS REPLACEMENT PARTS

AVAILABLE FROM FERRIS BROS. PTY. LTD.

SYDNEY XF 0221. MELBOURNE 42-3141. BRISBANE 56-0102. NEWCASTLE 61-5071. WOLLONGONG B 1922. EDMUNDS BROS. PTY. LTD. MELBOURNE, FB 3971. RADIO PARTS PTY. LTD. MELBOURNE, FY 1251. BREVILLE WHOLESALE PTY. LTD. SYDNEY, 56-5446. UNIVERSAL CAR RADIOS, EAST SYDNEY 35-4358, and BURWOOD 74-2525. TEDCO PTY. LTD., PERTH, 21-8221. W. & G. GENDERS PTY. LTD., LAUNCESTON, HOBART, DEVONPORT, BURNIE.

TELECOMPONENTS

PTY.
LTD.

A DIVISION OF FERRIS INDUSTRIES LTD.

player, hi! It had them all guessing and Bob innocently redirected Dave ZEO in the direction of Katoomba and it was not until Dave enquired who the fox was did he realise he had been tricked. A good day was had by all and it is hoped we shall break another record next year. Prizes were by the courtesy of Phillips and B.S.R.

Jack 2NC is nearly ready to go on 2 MHz and is copying everybody loud and clear. His gear will be common equipment for mobile and was station with a 640 for the home rig. Noel 2ZNS has already turned the first page in his log using an 833 in the final. He gets out well to north, south and west, but not to the east. The diversions in Dec. 1971 will raise his antenna for fly contacts. 2ABY is back in the district and is on 2 mhz, operating from Penrith. Trevor 2TMM has moved lower down the mountains to Glenbrook, but as yet still not on the air. Aric 2BS, from Springfield, has received his call, 2AVA, so keep your eyes out for Aric on 2.5. Instead of Alex 2BY.

Jamboree stations were operated from 2NK, 2AVA, 2AVN, 2ART, 2ADA, 2ASZ and 2AAT, and most contacts were made on 2 mx. Only the boys who were interested in our "art" turned up this year, leaving the wild ones to their own devices. From all reports it was generally a better year than previous.

The bush fire boys have been out every week-and spotting for fires and had one experience near Warrimoo where communication was excellent and well covered, but the fire fighter co-ordination was a bit poor, but no real danger resulted, so all ended well. 2ADA



VICTORIA

EASTERN ZONE

Graham 3Z brought back a 10 transistor Heathkit Communications rx that seems to be an excellent performer. Talking about new rx's, several of the boys have purchased these new radios in the last few months and had good results. Bill 3AMH should be on 144 Mc before Xmas using a.s.b. Ken 3ZNX was successful in passing his full op. license. Ken also has taken up the position of Editor of our local station (Ch. 10) Alan 3ZNB, of Anderson, is now building up equipment for 50 Mc. Peter 3ZGM spent the first week of the month in our some, operating on the 50 Mc. band. Willard's Promotory using the 50 Mc. band.

Our next Zone Convention is to be held at Warragul around March, so any suggestions would be welcomed, constructive or otherwise.
73. 3ZCG.

MIDLAND ZONE

The Scout Jamboree activities were attended to by SDG, SZK, SND. I have no information as to just what transpired at SDG and SZK, but for myself the time I had at my disposal was very fruitful and several excellent contacts were made with VK and ZL, and much information flowed back and forth.

We have swelled our ranks with a new call—JME, and welcome to you OM, good hunting with your Collins' 3281. May even work you on 15 or 20 max if skip permits.

By the time these notes appear in print we will have had our general meeting at the Bendigo Technical College on 16th Nov. and reports of the doings will appear next month.

ZACN will have taken the plunge on 17/11/62 and taken unto himself an XYI, 73 and 88 to you both and may all your troubles be little ones.

Jim SSV is attending to WLCEN activities and participated in the recent exercise from which he returned a nervous wreck. Hl. hl.

Activities on 144 Mc. have been spasmodic and not much information to hand. However with the approaching summer there should be an upsurge in activities generally. T3, END.

SWIFT KIDNEY: BRYAN

Murtoa was the venue for our annual get-together last month. We were sorry that because of the passing on of his wife, a former President, Herb JNN, could not be with us. One of the first arrivals was Trev 3ATE, who came per Cessna aircraft. Having his mobile gear installed in same, he was able to work the local boys on the way down. Mr. Len Grotz, a friend, was the pilot.

Members came from across the border in South Australia, Ararat, Balmoral, and Lascelles, so long distances of our zone were well represented. About 40 made up the party.

Office-bearers for the coming year elected were as follows: President, Merv 3AFO; Vice-Presidents, Bert 3EF and Vic 3AEQ; Sec.-Treas., Bill 3AKW

The tx hunt was won by Vic Maddern and party. A look over the broadcast station, 3LK, occupied the afternoon. After evening meal at the Commercial Hotel, we all adjourned to Keith's (3ATS) home. Here we saw slides shown by Chas VK5IB, ex-VR1B. These were taken during his stay on the Gilbert Islands.

QUEENSLAND

The Oct. 6 general meeting held in the State Service Union rooms at 814 W. 12th was attended by 24 members; quite a drop from the usual number of 40. However, some important matters were discussed. Firstly was the referendum on whether there should be a permanent site for the FWI and the point that only 25 per cent. of members expressed their views. However, the majority of those present (18) had many indicated that a permanent site should go ahead and the committee formed to go into the questions of land and a building. Bert AAO suggested that the formation of a committee should be deferred until the acquisition of land had been confirmed. Accordingly, Bert was authorised to

Concern was expressed on the lack of disposals gear offered so far this year. Only one item, an indicator unit, with valves and power supply, has been put up for ballot. The meeting was told that a letter would be sent to the Department of Supply inquiring into the position.

The printing of copies of the Divisional constitution was again raised. The chairman said the committee formed to review the constitution had requested Federal Hdq. to clarify some points and when a reply was received, the committee would discuss them. Any alterations necessary would be presented to a general meeting for ratification.

Probably the most satisfying point of the business was the acceptance of another seven members into the Institution. K. J. Benson (MAGX), T. H. Cuthall (485) as members, and G. R. A. Suterland (488) as a member, and V. R. MacDonald, E. J. C. Clarke and T. Beine as associates. This brings the total membership to 100 and it appears that the goal of 400 will be reached by the end of the year.

The night's lecture was given by Mr. Bruce Gow, engineer in charge of the Standardising Laboratory, of the Brisbane City Council's Electricity Department. His lecture dealt with the use of resistance, current, and voltage using modern methods and equipment. Members have been invited to visit the laboratory on Nov. 30. The day was from 11m 45p as carried by Association.

INTRASTATE CONTEXT

Aif 40L, and station manager of 4WI, took the Sunshine State Contest held during Sept. He was awarded 32 points which is a creditable performance considering he had to work during the day. The top three winners are more or less 4GG and Ron ARG both with 31 pts. with 4LT third with 30 pts. In the a.w.l. section, C. H. Thorpe LA018 was first with 36 pts. (Thence C. O'ally 133 and W. C. Fall 129). Numbers 1 and 2 were awarded 35 and 34 points. Many more calls will be heard in the next contest. And while we're about it, now is the time to think and work about the National Contest Day. VK4 has the chance to put up a great show.

Divisional Council, which met on Oct. 11, is keen to receive items for the agenda for the Federal Convention next year. So what about discussing matters at your next club or Division meetings?

JAMBOREE-ON-THE-AIR

The effort in this event in VK4 this year appeared good, despite the usual poor and unpredictable conditions. A number of ambitious propositions had been made, but no suitable have been received. Some of the stations were on in the Brisbane area and the South Coast, but the majority of the stations and the South with Scouts showing they are just as good at rag-weeping as some of the stations in the north. The 4WL operated from Boy Scout Hdq. in the Valley, but unfortunately few Scouts heard the program. The station was in the air. Thanks go to the operators there, including Vince 4VJ who made quick repairs to the station. The station was in the air this morning, even if the news was late. Appreciation again deserves the thanks of all for supplying the very best equipment including the gift of a Hallicrafters.

The New Issue of 1962-63

CALL BOOK

is now available

ORDER YOUR COPY NOW!

THE "DO" AT BARBARA

I must say a good time was had by all. Chape began to arrive soon after 8 a.m. 4X3R and myself did not arrive until about 10.30 a.m. Rusty 4JTM and some of the Hunsdberg crew were there, getting things up and running. A visiting 4K7 and a Hallcrafters BX100—kindly lent by Bill Bertram. Bill attended in person with his wife and family and we are grateful to him for the use of the gear. By noon 4X3R, 5LN, 4HZ, 4M, 4X3R, 4JTM and I had our usual arrival and we had 18 present for lunch. After lunch, everybody was rag-chewing until the hook-up at 2 p.m. and after afternoon tea at 3 p.m., blindfold hunts were held. The last hunt ended until the next day from 10.30 to 5 P.M.

4WQ was on the air on the Kookaburra session at 7 a.m. on Sunday morning and all were shocked to learn of BJ's misfortune when his workshop was destroyed by fire during the early hours of Sunday morning. Blindfold hunts were continued, followed by v.h.f. tx hunt, until the auction of odd gear. Harry 4ZHG was the auctioneer and did a very good job.

After a further 7 Mc. scramble prizes were presented. 4Hz, 1st scramble; 4WS, longest distance travelled; Ken C., best constructed gear, 1st; Roy S., 2nd, Ken C., blindfold hunt; Lena B., ladies' section, Ken C., hidden tx hunt; Bill 4WS, 2nd 7 Mc. scramble. 73, 4LN.

During the month the Ipswich and District Radio Club continued to progress. The publicity officer, Bill Febn, said 58 members visited the Ipswich Airport and then had attracted another eight new members at their Oct. meeting. At this meeting, Mr. F. Wood lectured on the fundamentals of radio. The last word was that the club was planning to inspect the radar installations of the Amberley R.A.A.F. base.

As far as could be ascertained there was no activity here in connection with the Bouca's disappearance. The first person who made the suggestion that this area missed in participating.

As usual a number of Southern boys have been on the Coast. Many of these were mobile campers, and they had been in the area for a number of the locals. The outcome, due to the efforts of Cret ZAO, was a get-together at Surfers Paradise near the beach. The group consisted of about 100 people, many of whom were present due to sudden illness, and it is pleasing to record that he was fully recovered in a few days.

The following names were present: Cret ZAO, Ken AZGX, Nell AWW and Bill AWS. All appreciate your efforts, Cret, but do not stop there. Let's have another "Do-It-Yourself" search party in the South or any point of the compass is here.

At the Bundaberg Trades and Industries Fair held in conjunction with the Bundaberg Sugar Festival, from Oct. 8 to 13, the club displayed a very useful radio station. The station was an auxiliary radio communication equipment. The station used the official call sign of the Wide Bay and Burnett Branch of the W.T.A., VK-4WQ. It consisted of a table-top unit using a 100 watt 6X4 tube, a 100 ohm 500,000 ohm variable 50w. input, plate and screen modulated by a pair of KL36s. Output was coupled via a balun to an all-band antenna (off centre fed) with a 100 ohm line. A relay switching unit was made up like the station was operated from the one control switch.

Over 80 contacts were made during the week-end and it is planned to send all stations worked a QSL card. A blackboard was used as a log to keep the crowd informed of the nightly progress of contacts. 72, 47M.

Once again the summer season is upon us and the v.h.f. boys are again turning northwards looking for the openings to Japan on 90 Mc. On the h.f. bands, must admit is galling to hear the boys in other States giving the European stations such wonderful reports when they are just audible here.

As this is the festive season, I take the opportunity to wish each and every one the Compliments of the Season. As I spent last year overseas to dodge the heat, will take the time this year to visit as far south as Hobart, so you VK7 boys bake the cake as I will be there early in February and wish to meet a few of you personally and extol the beauties of the Sunshine State. 73, 4RW.

The monthly general meeting of the VKS Division was held to a "standing room only"

One or two important matters of business were taken care of prior to the auction, the first being the matter of an installation of an Amateur exhibit at the coming Exhibition in March next year at the Showgrounds; the matter being to whether the Division should move to more spacious club rooms or not. A very little interest was displayed as first to the latter. Very present in the Amateur exhibit angle until Luke ELL, in an endeavour to "needle" some sort of reaction, stated quite plainly that the last effort alone, these years by the Club

Nothing further can be written about a dismal scene that the writer has never written before, although I think the standard of gear now being offered is well below that of, say, a year or so ago, and this goes also for the furniture. The furniture is not so good, and, as these cabinets, because several good looking steel cabinets were offered to the bidder, I reached six shillings in the bids, but were all sold later to a hungry and battling mob for a few pence. We were not able to get whatever the opinion as to standards, or quality, or quantity, one thing is certain, the buyers and not the sellers are the losers. In meaning to them all, both from numbers present and entertainment value—a. b. because notwithstanding I could engage upon this subject, I must move on to the next day.

The meeting closed at the somewhat early hour of 10.30 p.m. with three hearty cheers for the success of the auctioneer, the auctioneer's looking assistant, Norm Colman. Well, actually, that is an exaggeration, there were more than three cheering sections to cheer him up, but they meant well.

Joe SJO is still putting out his well known brand of transmissions on 7 Mc., although judging by the whistling, the coy phrases into the "mike", and the general air of uncertainty in his voice when heard here, he was not too sure if all was well. Tell them to buy a new receiver Joe. Athol SGL heard for the first time for a long while on 7 Mc., and with the strength and quality of the signal I cannot imagine just what he is not yet hearing him. Last time reported hearing him was very decidedly coarse about it. Even suggested I had ultra-sensitive ears as he was not on.

Tom 3AQ heard during the callback was on a.s.b. and believe it or not, I was copying every

IT'S NEW! IT'S NEW!

AMATEUR RADIO HANDBOOK

BY R.S.G.B.

Price 56/3 and 2/6 postage

This book provides a first class course of instruction for the intending Amateur Operator and a gold mine of reference for those already experienced

A MUST FOR ALL ENTHUSIASTS!

AVAILABLE NOW FROM:—

MCGILL'S AUTHORISED NEWSAGENCY

Established 1860.

183-185 ELIZABETH STREET, MELBOURNE, C.1, VIC.

"The Post Office is opposite"

Phones: 60-1475-6-7



UNIVERSAL SOUND

A Product of Italy

Model 601 is a Dynamic Unidirectional (Cardioid) Microphone for studios, music and public address, strongly built and famous for quality.

Output: —54 db. (1 volt p/microbar).

Response: 50-12,000 c.p.s. unidirectional.

Impedance: 25,000 ohms, easily stepped down to 250 ohms.

High or low impedance selection.

Dimensions overall: 60 x 60 x 155 mm.

(2-3/8" x 2-3/8" x 6-1/8").

Low frequency change switch for use when speaking.

DYNAMIC CARDIOID MICROPHONE

Model 601

Free of amplitude, phase and harmonic distortions. High and low impedance. It offers an additional discrimination factor with a difference of 18 db. from front to back.

On-off switch on handle

Detachable connector.

Retail Price: £25/14/0

Plus Sales Tax £2/9/0



Marketed by **ZEPHYR PRODUCTS PTY. LTD.**

58 HIGH STREET, GLEN IRIS, S.E.6, VICTORIA

Phones: 25-1300, 25-4556

were notable in assisting with this worthwhile cause. Associate Hans Frost, who is also a District Commissioner, did his best to organize the Jamboree, but there were not sufficient offers from Ham. To the other in the metro. area who made their rigs available, big hit in the country areas, and on the brighter side of things, Katsanung really gave the boys a lot of fun. The boys were very happy to see the Scouts and even Scouts from Katsanung. Kojoneup, and Broomehill visited shacks in Katsanung. Herb GKO, Robby GKH and Clarvie KGC handled ground work for the Jamboree and night, and again on Sunday morning. I understand that conditions were variable, but some good contacts were made, not only local but overseas. Now I suspect that there were other country stations on too, doing this worthwhile job, but nobody tells me! In this case, just best to let Scouts make their own field to grow good Hams!

Alan EAB has been seen around Katsanung again. Hear tell that Joe 6FD has been a temporary resident in the village, too, usually making to meet the X boys after 3 p.m.—sharing hospitality and fellowship with them. For each course.

I am getting suspicious. I have a feeling that they are on to me! My secret mail has been intercepted. I received three letters to three widely separated parts of the State, including stamped, self-addressed envelopes, to three of my newest recruits to the spy ring. What did I get? Last November. Not even a sign. (Definition: Signet—a small signal, similar to cypher, only different. Has no value. I like it. Not a signet, but a signet P.G. (that's short for P.M.G., but disguised, because he pays my salary). So I hope I've passed the message and that my boys have seen the picture, and put their hands to the plough, before we have our backs to the wall, and don't have anything to write about at all. (Sorry, I didn't mean that to rhyme!)

By the way, a small signet, i.e. a very young signal, tells me that Neil 6ZDK is disposing of a low frequency rig. What about tonight on 10.1 kHz and using it yourself? Should make a good portable rig. Sounds like Bill GRX is going for the big time, too, because his Gelsonix is going out. What's next Bill, a Collins, or something? Continue with the good work anyway, Bill and Allen, too.

Well, yet moves on rapidly and our next meeting will be the last for the year. Our Christmas meeting is the highlight of the year, so don't miss it. The President's trophy for the best DX, or Collins, or something, to the winner of the 1963 effort. So best bid and tucker on for this, brush off the blue suit and come.

Talking about brushing off. There was this L.V. serviceman, see, who had a new assistant starting. First morning, carries a l.v. chassis onto Sandstone. Says to the boys, "Link the l.f.s. are off, we'll sweep it first." New boy, puzzled, says, "Er—wouldn't a vacuum cleaner be safer?"

So, it's just as well this is my last effort for the year. Compliments of the Season to you, Ham, and you, the members of Council, all the other members of the VK5 Division, and myself in particular. 73, 6LS.

Repairs to Receivers, Transmitters; Construction and Testing; T.V. Alignment; Low Noise Final Conv., any frequency, £18/10/6 plus tax.

ECCLESTON ELECTRONICS
146a Cotham Road, Kew, Vic. WY 3777.

D.C. CONVERTER TRANSFORMERS

Miniature toroidal transformers for transistor d.c. to d.c. converters. Fully encapsulated in epoxy resin. Suitable for horizontal or upright mounting. Voltage doubler circuit.

12v. in, 300v. 100 mA. out £4
12v. in, 300v. 200 mA. out £5

Other voltages up to 350 watts output supplied to order.

400v. silicon rectifiers 8/11
Above prices subject to sales tax. Carriage free.

ELIZABETH ELECTRONICS
P.O. Box 7, Elizabeth, South Aus.

TASMANIA

Heartiest congratulations and best wishes to Don TDK and Yerna, his XYL, around the VK7 Division and all of us individually on the occasion of their marriage on Monday, 23rd Oct. We sincerely wish both of them a marriage with lots of QRM but control of harmonics. The happy pair have been heard operating TDK mobile during their honeymoon on the north-west coast of Tasmania.

The Jamboree-on-the-Air is over for this year and I think it is true to say that operating conditions as regards QRM were not as severe as those of last year. Both 20 stations, both h.f. and v.h.f., operated at one time or another during the Jamboree and the results of their efforts were really quite impressive, considering the state of affairs. Several stations, including 7BS, 7RX, 7CT, 7TF and TDK, were heard operating from camp sites under weather conditions not at all in favour of camping. 7WI was operated at full stretch by special permit to David 7ZAT and many fruitful contacts were made, despite the trouble. New 7ZEE operated as the v.h.f. control station during the Jamboree, and did a very good job indeed on 2 m.m. We are indebted to Mary and John 7ZAY for their help. The dial cord on the 7WI rx early in Oct., and that was a job much harder in the failing days of the year. The 7ZAY 20 new stations are also operating on 2 m.m., namely John 7ZOO and Rex 7ZAT. Welcome to both of you.

Talking v.h.f., Rob 7ZAL is now portable at Stanley and will be looking for 3 m.m. contacts throughout the Division and over the water for the next few days. Two new stations are also operating on 3 m.m., namely John 7ZOO and Rex 7ZAT. Welcome to both of you.

Greetings also to Ted 7ZBB at Postina. We have not heard you down this way. Two, but we hope to. Rupe 7RM has been in Adelaide for a month visiting his sister over there. Was nice to hear and chat with you again, Rupe.

The c.w. section of the VK-ZL Contest took place about the middle of October and three stations were heard in the VK5 Division. It would seem to have led the field from this Division. Several of us have been pleased to hear of the success of the VK5 team during its annual holidays on Lord Howe Island, providing us with another country. Arch was also heard to have a dog pile all to himself on 10.1 kHz. I hope to hear of him again. I spent three weeks touring around VK7 during November and many of us met him too. Terry 7CT is to lose a daughter, and I hope the law about the middle of December, consequently his pocket is being hit hard at present and his radio time is severely curtailed. Alan 7MY has by now moved to Hobart, but is at Cremorne and is talking of going on s.a.b.

Our Nov. Divisional meeting we were lectured most impressively by Joe 7BJ on the subject of crystal filters. It is not for nothing that Joe is called the "master". Well, the Old Master gave a mastery address even for the Old Master on this very difficult, definitely touchy subject. His words were delivered both in a friendly and a superlative style, and all of which are ideal ingredients for a wonderful address. Thanks, Joe.

Finally, from myself, the President, Councilors and representatives of the Bureau, all a very happy Christmas and a prosperous New Year, and may we experience lots of radio activity from you in the time to come. 73, 7ZZ.

NORTH-WEST ZONE

Well chaps, the festive season is almost upon us once more, complete with disrupting influences to Ham Radio! The next meeting on Tuesday will be the last for the year, for everyone, especially you Ulverstonites. Kevin 7ZAF was your only representative at the last meeting. The meeting was strictly a social event. Unfortunately I could not be present, but from all indications a good time was had by all. Sid 7SF had some excellent moves and Max 7RX a collection of superlative slides to show. George 7XL also had some wise words to say about mobile antennae.

It is most gratifying to see the Southern boys rise to the occasion at the Bureau's Christmas broadcast. On 3.5 Mc. no trouble should be encountered in copying. Speaking recently to the Don Service District Council, I was told that in passing that he was impressed by the Amateur fraternity as a whole, and hopes the Jamboree-on-the-Air will become an annual event.

The bands have been quiet lately, but by reports 7SW is doing big things on 30 mc c.w. Should be able to get some more out of his new quad up and 7SF strokes the new c.w. things will hum! Max 7MX and XYL on extensive tour of VK3 and VK3 at present time. Keep kinks on your shacks, you boys! 73, 7ZBH.

NORTHERN ZONE

Of licensed Amateurs in this zone, or more correctly still, in the near vicinity of Launceston, 17 per cent. have not been active for some years and unfortunately do not seem likely to ever become active again. If stations who appear on the air only once or twice a year were added this figure would rise to well over 50 per cent. Considering therefore that we are now getting an average attendance of 17 per cent. it can easily be seen that this figure is made up of quite a few associates. Fortunately at least four of these definitely intend taking the A.Q.C. exam in February so in the interest of the zone it is essential that all licensed members help these associates to the limit of their ability. This will ensure a strong and active zone for the future.

Ted Byrnes has now received the call sign 7ZBB and is operating on 144 Mc. from Postina with good equipment. 7BQ can be heard regularly on 144 Mc. and is at present working on a 380 Mc. rig. 7BR at Evandale, not active but still threatening to get on 144 Mc. 7CA is occasionally on 7 Mc. Sunday mornings, appears as though Max has been doing too much night work. TDK temporarily off the air, but will be back in the near future. Den may be changing his QTH—all the best of luck. Den. 7CT active on 7 and 14 Mc. 7DAN. Den with much success. 7ZL has been overhauling all v.h.f. gear and is now ready for the coming season. H5, 144 and 388 Mc. rigs operating. TPF building a v.d.o. for the coming season.

The December meeting of the zone will be held over Geoff Lutwyche's radio shop, George Street, Launceston, on Friday, 14th Dec. All are welcome.

HAMADS

Minimum 5/-, for thirty words.

Extra words, 2d. each.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. The minimum received at Box 36, East Melbourne, C.S. Vic., by 31st of the month, and remittance should accompany the advertisement. Advertisements not permitted in Hamads. Dealers' advertisements not accepted in this column.

FOR SALE: Type 3 Mark II, good order, includes series screen modulator, £25. J. Lloyd, Phone 88-3614 (Vic.).

SELL: AR7 £35, AR8 £15, 611 Walkie Talkie £4, 550v. 250 ma. power supply £27/10/0. 522 set £5. Class C Wavemeter £27/10/0. 150w. a.m./c.w. Table-Top Tx, 80-10, commercial finish, £30. All equipment in A1 order, complete with spares, etc. VKASS, 35 Whynot St., West End, Brisbane.

SELL: BC433 Compass Receiver, new in original carton, with tuning box and flexible drive, £12/10/0. Wanted 455 Kc. 2 Kc. bandwidth Mechanical Filter. B. L. McCubbin, VK3SO, BW 1587 (Melbourne).

SELL: Collins KWM1 s.s.b. Transceiver, perfect condition, £400. Trager Flying Doctor Service Mobile, easily converted to Ham Bands, £25. VK3SK, Bob Slutzkin, 8 Lynedoch Ave, S.16, Vic. Phone LB 1861.

SELL: Drake 2A, as new, used sporadically over last 12 months. Will sell to best bid over £125. Roth Jones, 131 Queen Street, Melbourne.

WANTED TO BUY: Type A Mark III. Transceiver in good condition and unconverted. 6 volt. waterproof supply, spare tubes and waterproof covers needed. phones not required. Good price paid. M. J. O'Brien, Edgar Ave, San Remo, Vic.

INDEX TO VOLUME 30-1962

ANTENNAE

Antenna Construction Hints	Apr. p.4
Antenna Switching Unit	Nov.p.14
Matters Mobile-Part 1	Aug. p.2
Part 2	Sep. p.2
Errata	Nov.p.17
Mobile Whip-Ferramic Core	Jan. p.3
Multiband Folded Dipole	May p.5
The Inverted "V" Antenna	Oct. p.14

AUDIO AND MODULATORS

Driving the Zero Bias 807's	Sep. p.9
Increased Audio Without	Mar. p.5
Modifications to Modulator Design with OC26 Transistors	Sep. p.5
Negative Cycle Loading	Feb. p.11
Spitter-Its Cause and Prevention	Jul. p.2
75 Watt Modulator	Sep. p.7

BOOK REVIEWS

Radio Amateur's Handbook	Jul. p.14
Super Radiotron Valve Manual	Jul. p.14
The Amateur Radio Handbook (R.S.G.B.)	Jul. p.14
World Radio T.V. Handbook	Jul. p.14

CONTEST RULES AND RESULTS

National Field Day 1962, Additional Rule	Jan. p.9
National Field Day Contest Results 1962	Sep. p.13
Remembrance Day Contest '62	Jul. p.12
R.D. Contest Results, Amendment	May p.7
Results of 1962 R.D. Contest	Dec. p.14
Ross Hull Memorial V.h.f. Contest, 1962-63	Nov. p.9
Ross Hull Memorial V.h.f. Contest 1961-62 Results	May p.9
VK-ZL DX Contest '61 Results	Apr. p.16
VK-ZL DX Contest, 1962	Aug. p.11

HINTS AND KINKS

Cheap Metal Cases	May p.7
Clock for Shack	Jan. p.7
Dial to Read 0-360 Degrees	Jun. p.9
Frequency Jumping V.l.o.'s	Feb. p.12
Modifications to No. 122 Set	Jan. p.7
Spitter	Jan. p.7
Tuning a Mobile Whip	May p.7

INSTRUMENTS

A Grid Dipper for V.h.f.	Oct. p.15
Cathode Ray Tube Characteristics	May p.4
Getting to Know the Oscilloscope-Part Two	Jan. p.4
Notes on the BC221	Dec. p.5
Station Test Equipment-The Modmeter	Jun. p.3
The C.D.O.	Oct. p.23
Xtal Calibrator Circuits Using Transistors	Jul. p.14

MISCELLANEOUS

Amateur Radio Thrill for the Lads	Feb. p.13
Amateur Station on Display at Adelaide University	Mar. p.8
"An Award Owed"	Sep. p.11
Attention Blind Amateurs	Jan. p.7
Aust. DX Century Club Award	Jan. p.11
Aust. DXCC Countries List	Jan. p.12
Aust. V.h.f. Century Club Award	Jan. p.11
Awards and Certificates	Aug. p.10
Emergency Services & S.s.b.	May p.11

Erection of Amateur Towers	Aug. p.10
Ex Members of R.A.A.F.	Mar. p.4
FK6, YJ1, FW8, VR2 DX-pedition, 1962	Nov. p.3
Four Hams at Norfolk Island	Mar. p.8
International Amateur Radio Station 4U1UT Inaugurated	Nov. p.10
Jamboree on the Air	Aug. p.9
Jamboree on the Air	Sep. p.13
Jamboree on the Air	Oct. p.24
Jamboree on the Air	Dec. p.13
National Field Day Misadventure	Apr. p.13
N.S.W. Division's 12th Annual Convention at Dural	Mar. p.9
Official Opening of New H.Q. Building, N.S.W. Div. W.I.A.	May p.8
Radio Aurora Incidence	May p.7
Radio Details of Russia's Spaceship	Feb. p.10
R.S.G.B. Hon. Certificates Manager	Jul. p.15
Space Communication in Australia	Sep. p.12
St. Lawrence Sea Way Award (Canada)	Feb. p.21
The Canadian Award	Feb. p.21
The Oscar 2 Project	May p.7
VK2 to ZL3 on 144 Mc.	Feb. p.12
W.I.A. Federal President's Report, 1961-62	Jun. p.12
W.I.A. Queensland Division Convention	Jun. p.16
W.I.C.E.N. Exercise by S.A. Division	Dec. p.20
Youth Radio Clubs	Aug. p.13
13th North Coast & Tablelands (VK2) Convention	Jun. p.16
26th Federal Convention at Perth, 1962	Jun. p.11

MISCELLANEOUS TECHNICAL

A Colpitts Transistor Osc.	Oct. p.7
Great Circle Bearings for Aiming an Antenna	Oct. p.21
Inductance, Capacitance and Resistance	May p.3
Noise Factor of Some V.h.f. & U.h.f. Glass Base Valves	Apr. p.11
Technical Topics	Dec. p.9
The Best Band for V.h.f.	Apr. p.5

POWER SUPPLIES

A Transistor Power Supply	Nov. p.5
Matters Mobile-Part 1	Aug. p.2
Part 2	Sep. p.2
Semi-Conductor Rectifiers	Feb. p.7
Silicon Diodes for the Radio Amateur	Apr. p.3

RECEIVERS

A Like-New Mixer Circuit	Jun. p.4
A Novel Method of Bandspreading	Jul. p.9
Beginner's 2 Valve Superhet with Bandspeed and B.f.o.	May p.4
Diversity for the Amateur	Sep. p.6
Junior Short Wave Receiver, 19 to 49 Metres	Feb. p.11
Matters Mobile-Part 1	Aug. p.2
Part 2	Sep. p.2
Errata	Nov. p.17
Modern Receiver for the Amateur Bands-Part One	Oct. p.9
R1155 Receiver Modifications	Feb. p.3
Simplified High-Performance Two-Metre Converter	Nov. p.2
Some Notes on Bandpass Xtal Filters	Jun. p.8
The Importance of Adjacent Channel Selectivity	Aug. p.8

The VK7 W.I.A. V.H.F. Group	Dec. p.3
144 Mc. Communicator	Jun. p.9
Transistorised Converters, 144 Mc. to 7 Mc.	Apr. p.9
Transistor Radios, Part 2	Jul. p.14
Xtal Calibrator Circuit Using Transistors	Jul. p.14

SIDEBAND

A Bug Squasher	Dec. p.18
A.l.c.	Jul. p.21
A.l.c.	Aug. p.19
A.l.c. in HT32	Nov. p.14
A Low Cost S.b. Transmitter	Jul. p.11
Antenna Switching Unit	Nov. p.14
A V.h.f. Sideband Rig	Oct. p.17
Errata	Nov. p.17
A 100W. P.e.p. Bandswitched Phasing S.s.b. Transmitter	Oct. p.3
Calculating Input Impedance of g.g. Linear Amps.	Sep. p.11
Crystal Filters	Oct. p.25
Errata (20N Linear Amp.)	Feb. p.15
G.g. Linear Amplifier	Jun. p.7
Modifications to K.W. Viceroy	May p.15
More on the Viceroy	Jun. p.21
Aug. p.19	Jul. p.21
New Balanced Modulator	Sep. p.19
Receiving S.B.	Dec. p.18
R.f. Phasemitter Circuit, VK-3AZM	Mar. p.13
Some Notes on Bandpass Xtal Filters	Jun. p.8
S.s.b. A.g.c.	Oct. p.25
S.s.b. Noise Limiter	Sep. p.18
S.s.b. Power Measurement	Nov. p.11
Suggested Operating Rules, S.s.b.	Jan. p.19
Tank Loading Circuit at VK-8ON	Nov. p.14
The Importance of Adjacent Channel Selectivity	Aug. p.8
VK2ON Tx (TR Switch and A.l.c.)	Feb. p.23
VK3AHL 288 Mc. S.s.b.	Apr. p.19
608 Product Detector	Apr. p.19

TRADE REVIEWS

G.R. Digital Time and Frequency Meter	Mar. p.7
Ian McMillan TX150/75 Tx	Feb. p.15
L.A.G.85 Audio Sig. Generator	Jul. p.15
New Techniques in Gas Chromatography Analysis	Feb. p.15
The 9R-59 Receiver	Jul. p.15
TR6S Multimeter	Jul. p.15
V.t.v.m. Model 300	Sep. p.11
Weston "Clipper"	Jul. p.15

TRANSMITTERS

A Colpitts Transistor Oscillator	Oct. p.7
A V.h.f. Sideband Rig	Oct. p.17
Errata	Nov. p.17
A 100W. P.e.p. Bandswitched Phasing S.s.b. Transmitter	Oct. p.3
Crystal Controlled Transmitter for 576 Mc.	Nov. p.6
For 288 Mc. Enthusiasts	May p.7
Errata	Jun. p.15
Matters Mobile-Part 1	Aug. p.2
Part 2	Sep. p.2
Errata	Nov. p.17
Minitrans 6-2 V.h.f. Tx	Mar. p.3
Mobile Transmitter	Jul. p.5
The VK7 W.I.A. V.H.F. Group	Dec. p.3
144 Mc. Communicator	Jun. p.9

HAM ADS

For this issue, turn to previous page.



Warburton Franki CHRISTMAS SPECIALS

● POWER TRANSFORMER

A. & R. Type No. 1917—

Primary: 220, 230, 240v.
Secondary: 280/0/280v. at 50 mA.
16v. at 450 mA.
6.3v. at 600 mA.
6.3v. at 1.8 A.

20/- plus tax 25%.

A. & R. Type No. 1916—

Primary: 220, 230, 240v.
Secondary: 325/0/325v. at 70 mA.
6.3v. at 2.25 A.

24/- plus Tax 25%

Pack and Post, either of above, 2/6.

NOTE: Good variety of Superseded Output Transformers available at Special Low Prices. Write or Call for List.

● POWER DIODES

Australian made.

750 mA. at 400 p.i.v. 6/9 each

750 mA. at 500 p.i.v. 9/6 each

Both plus Sales Tax 25%.

Pack and Post 6d.

● CHASSIS PUNCHES

SET OF THREE

High quality hammer type Punches:
5/8", 3/4", 1-3/16", 39/6 Set S.T. Ex.

Pack and Post 3/6.

● PANEL METERS

Imported, 4" Square Case, 0-1 mA.,
6/1/6 each, S.T. Ex.

Pack and Post 1/-.

● TAPE RECORDERS

Few only left. Unicorn Tape Recorders,
Four Transistors, 18mW. output, built-in
Speaker, Earplug and Microphone
supplied. £16/12/0 plus Sales Tax 12½%

Pack and Post 3/6.

● HOOK-UP WIRE

Cotton covered. Rubber insulated, push
back type. 100 ft. coils, five colours
available. 6/6 Coil plus Tax 25%.

Pack and Post 10d. Coil.

● RECORDING TAPE

Celesto, famous Italian make.

5" 900 ft. Spools, 18/- plus Tax 12½%

7" 1800 ft. Spools 36/- plus Tax 12½%

C.B.C. American Tape

3" 225 ft. Spools ... 8/- plus Tax 12½%

Pack and Post 6d. each.

● RECORD CLEANER

Keep your Records clean with the
Goldring battery-operated Vacuum
Brush. A Vacuum Cleaner in miniature,
22/- plus Tax 25%.

Pack and Post 1/6.

● STYLUS Pressure Gauge

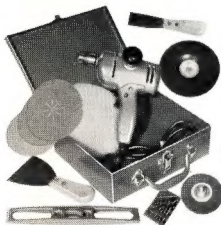
Check your Stylus pressure with the
Goldring Pressure Gauge. Accurate and
easy to use, 12/6 S.T. Ex.

Pack and Post 6d.

● NEW Decca Pick-ups

C/w. Deram Ceramic Stereo Transcrip-
tion Cartridge. Tracking weight, 2-4
grams. Frequency response, ± 3 db—
40 to 12 kc. Output 60 mV/cm./sec.
(per channel). £11/8/5 plus Tax 25±

Pack and Post 1/6.



Price squashed on POWER TOOL KITS

W.F. brings you a complete specially-com-
piled, handyman-inspired kit, with famous
BLACK & DECKER Drill, for only

£11-10-0

Look what this W.F. Combi-Kit gives you—

- Black & Decker 1" Drill, Model CP1.
- Set of 11 twist drills from 1/16" to 1".
- 3" grindingwheel together with 1" arbor.
- 5" diameter rubber pad.

- 5" lambswool polishing bonnet.
- Selection of fine, medium and coarse sanding discs.
- 1 paint scraper.
- 1 putty knife.
- Sturdy, compact metal carrying case.

HOW IS THIS PRICE POSSIBLE?

It's simple merchandising arithmetic.
W.F. anticipate a huge turnover on
these specially-compiled, quality kits.
Consequently unit price can be
marked down to a bare minimum.
You save POUNDS!

FREE—to celebrate introduction
of these kits, W.F. will give away a
3-PLANE SPIRIT LEVEL
to the first 100 customers.



WARBURTON FRANKI


359 LONSDALE ST., MELBOURNE — MU 8351



● TRADE ALSO SUPPLIED

● OPEN SAT. MORNING

Please include postage or freight with all orders



The Management and Staff of AWV
take this opportunity to extend to
their many clients and friends the
sincerest of best wishes for a Merry
Christmas and a prosperous New Year.

Amalgamated Wireless Valve Co. Pty. Ltd.
Sydney Melbourne Brisbane